BEST AVAILABLE COPY

-1 C 4485-1

COMPUTER DECISIONS

JAN

THE MANAGEMENT MAGAZINE OF COMPUTING

A HAYDEN PU

C4013CCDY-B-----001D024045
CODY D
CONGRESSIONAL I SERV
SRI ACQUISITIONS HM305B1
4520 L'E INV STE 800
WASHINGTON DC 20014

Scenario for succession

Micros bolster mainframes

Wp packages

Common carriers

Career vs. family

Are you being pulled apart?

COMPUTER DECISIONS

THE MANAGEMENT MAGAZINE OF COMPUTING

JANUARY 1982

Volume 14 Number 1

Copies Printed: 124,410

FEATURES

79 How to keep the users satisfied/ by David R. Roman *A good rapport between dp workers and users can make everyone happier and more productive.*

84 Common carriers—faster, better, cheaper/ by John Seaman *With a blend of these services, a mix of company needs can be met at a reasonable price.*

110 Scenario for succession/ by Herbert Halbrecht *A formal succession plan can help a company direct only the most capable executives to the MIS/dp throne.*

118 Micros bolster mainframes/ by Frank J. Adams *Offline processing and editing—with micros linked to mainframes—can save time, money, and tempers.*

126 Career vs. family: Are you being pulled apart?/ by Martin Lasden *The demands of dp make maintaining a family life a tough business.*

144 Word-processing packages: Take your pick/ by David R. Roman *There's no shortage of choices for the MIS/dp manager who's shopping for wp software.*

176 Annual index of articles/ *A guide to* Computer Decisions *articles published in 1981.*

8

118

126

COLUMNS / DEPARTMENTS

8 INSIGHT
12 NEWS & COMMENT
38 SNYDERS ON SOFTWARE
56 DATA COMMUNICATIONS
60 OFFICE AUTOMATION
62 APPLYING MICROSYSTEMS
66 FOLLOWING THE LEADERS
72 COPING WITH VENDOR PLOYS
166 YOUR CAREER
182 SPOTLIGHT
182 SOFTWARE
186 DATA-COMM EQUIPMENT
190 SECURITY
192 ADVERTISER INDEX
193 SUPERMARKET
194 PERIPHERALS

COVER PHOTO: Edward Hardin

by Gideon I. Gartner

FOLLOWING THE LEADERS

Computer industry headed for vigorous decade

The computer industry experienced a remarkable boom during the 1970s, demonstrating a robustness which was not predicted at the start of the decade. For the rest of this decade, we predict even grander developments.

With the computer operations of General Electric, RCA, and Xerox knocked out, who would have believed that once obscure manufacturers like Storage Technology, Amdahl, Prime, Wang, Datapoint, and Data General would take up the slack. These six companies grew in total revenues from about $600 million to about $3.6 billion in the last five years. But you haven't seen anything yet. In the next 10 years, we expect the growth of the computer industry to quicken, despite its size. That's the good news.

The bad news for many competitors is that IBM will come out of its corner swinging, with a well-coordinated attack, as well as a few wild punches. The controlled flurries will improve its relative strength, after years of flabby posturing. The wild punches could deck some unwary opponents.

Predicting 10-year growth rates is impossible. Nevertheless, it is possible to identify powerful stimulants to growth. One, ironically, is the past decade's buzzword, distributed data processing. Why? Because few customers have really installed ddp to date. Decentralized, yes; distributed, no. Leading the trend is the function-packed workstation, which, with lower prices and the organizational drive for productivity, will explode in unit volume. These units, connected to other sources of processing power, will in turn absorb this power and fuel surprising growth in large systems.

Catalysts for growth

President Reagan is the willing helper in strong U.S. computer-industry growth prospects for this decade. The recently enacted tax legislation offers many catalysts, which in the aggregate must contribute to growth. (See "What Reagan's tax cuts mean to dp," in the October issue of *Computer Decisions*.)

Could the computer industry's dwarfs have realistically asked for more? Yes, they could have asked IBM to continue to flounder. In fact, with the federal government's help (the antitrust case), competitors hoped IBM would be straitjacketed, or split up, although not all competitors want IBM sectioned. (As one competitor put it, "That would mean contending with two or three IBMs!") Instead, IBM bided its time, developed new technologies, established some marketplace preconditions for its own aggrandizement (System Network Architecture), suffered the learning experiences of new business application software, sold its old inventory, tested the market with many small-system and office products, shifted to new business practices and distribution channels, funded staggering new capacity, and got ready to pounce.

IBM is now in the driver's seat, creating some of the new economics. Some competitors may be knocked out in the crossfire.

Shareholders benefit twice

The reorganization is a private affair, but the results will resound through the computer-manufacturing industry. Users will immediately see the effects of customer-

(Continued on page 70)

Projected growth for IBM and competitors

	Revenues ($ in billions) 1980	Annual compound growth rate	Revenues ($ in billions) 1990	Annual compound growth rate	Revenues ($ in billions) 1990
Dp industry	55.6	18%	291.0	18%	291.0
IBM dp	21.4	17%	102.9	14%	79.3
Rest of dp industry	34.2	19%	188.1	20%	211.7

Table shows two projected growth scenarios for IBM and the rest of the computer industry. Projections are based on IBM growing at 19 percent and 14 percent, compounded annually.

FOLLOWING THE LEADERS

(Continued from page 66)

oriented marketing, dealing with a single marketing representative (where before there were three, for large systems, small systems, and office products). But users will not see the cost savings, as IBM contracts from three huge infrastructures to two. Neither will they see the cost savings as IBM development is streamlined. Instead, shareholders will benefit from those savings twice: first, as reduced costs hit the bottom line directly, and second, as a leaner company prices its products even more competitively, and at a once-familiar profit level.

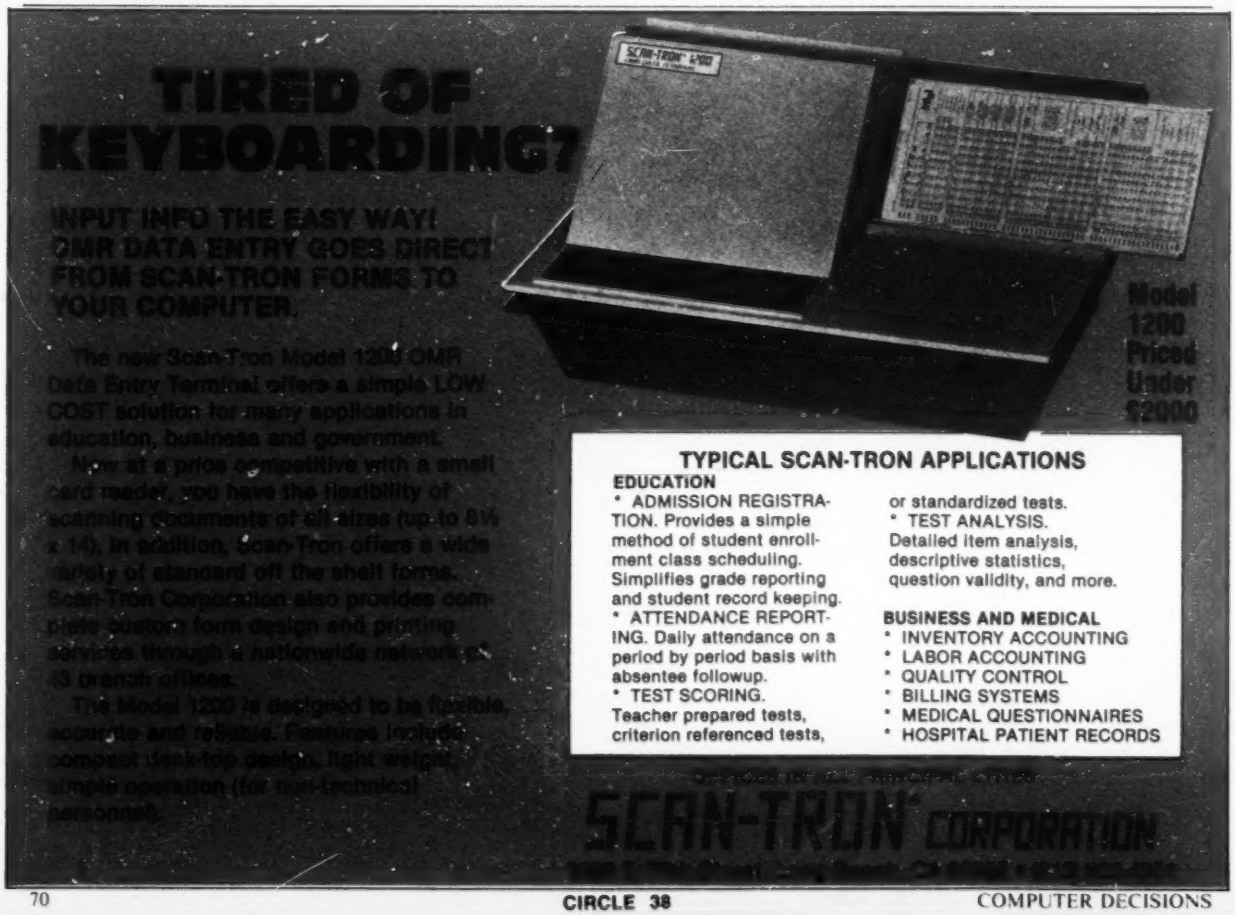
As time passes, users will see software and communication enhancements for various key products, enabling these devices to operate more cohesively. (See "New local net, voice store-and-forward from Wang" in the August 1981 issue.)

Our analysis revealed 1980 worldwide revenues of U.S. dp companies to be $55.6 billion, up 20.4 percent from 1979, which in turn was up 15.8 percent from 1978. The entire industry may continue to grow at an average rate of approximately 18.8 percent for the next 10 years. We are projecting that IBM will grow at a rate of perhaps 17 percent during this period, from its 1980 data-processing base of $21.4 billion (out of total revenues of $26.2 billion). The box on page 66 shows the implications of these projections.

An average annual compound growth of 19 percent for the rest of the industry, *excluding* IBM, can be inferred from the table. Not bad, but not what it might have been. If we assume the same total industry growth, but a more sluggish and usual IBM growth rate of 14 percent (Admittedly, IBM performance may affect the total, but certainly not on a one-to-one basis.), then we see the result shown in the color-shaded portion of the table.

Conclusion? The rest of the industry will continue to do very well, but not as well with a successful IBM regime in the picture as it otherwise might have. Since not all companies can be expected to do equally well, and since the differences can be magnified under adversity, a more successful IBM can exact specific competitive penalties. Lesson? All successful computer makers in the long run must continue to place a premium on strategic planning. □

Gideon I. Gartner is president of The Gartner Group, consultants, 72 Cummings Point Rd., Stamford, CT 06902.


TIRED OF KEYBOARDING?
INPUT INFO THE EASY WAY! OMR DATA ENTRY GOES DIRECT FROM SCAN-TRON FORMS TO YOUR COMPUTER.
The new Scan-Tron Model 1200 OMR Data Entry Terminal offers a simple LOW COST solution for many applications in education, business and government.
Now at a price competitive with a small card reader, you have the flexibility of scanning documents of all sizes (up to 8½ x 14). In addition, Scan-Tron offers a wide variety of standard off the shelf forms. Scan-Tron Corporation also provides complete custom form design and printing services through a nationwide network of 43 branch offices.
The Model 1200 is designed to be flexible, accurate and reliable. Features include compact desk-top design, light weight, simple operation (for non-technical personnel).
Model 1200 Priced Under $2000
TYPICAL SCAN-TRON APPLICATIONS
EDUCATION
* ADMISSION REGISTRATION. Provides a simple method of student enrollment class scheduling. Simplifies grade reporting and student record keeping.
* ATTENDANCE REPORTING. Daily attendance on a period by period basis with absentee followup.
* TEST SCORING. Teacher prepared tests, criterion referenced tests, or standardized tests.
* TEST ANALYSIS. Detailed item analysis, descriptive statistics, question validity, and more.
BUSINESS AND MEDICAL
* INVENTORY ACCOUNTING
* LABOR ACCOUNTING
* QUALITY CONTROL
* BILLING SYSTEMS
* MEDICAL QUESTIONNAIRES
* HOSPITAL PATIENT RECORDS
SCAN-TRON CORPORATION

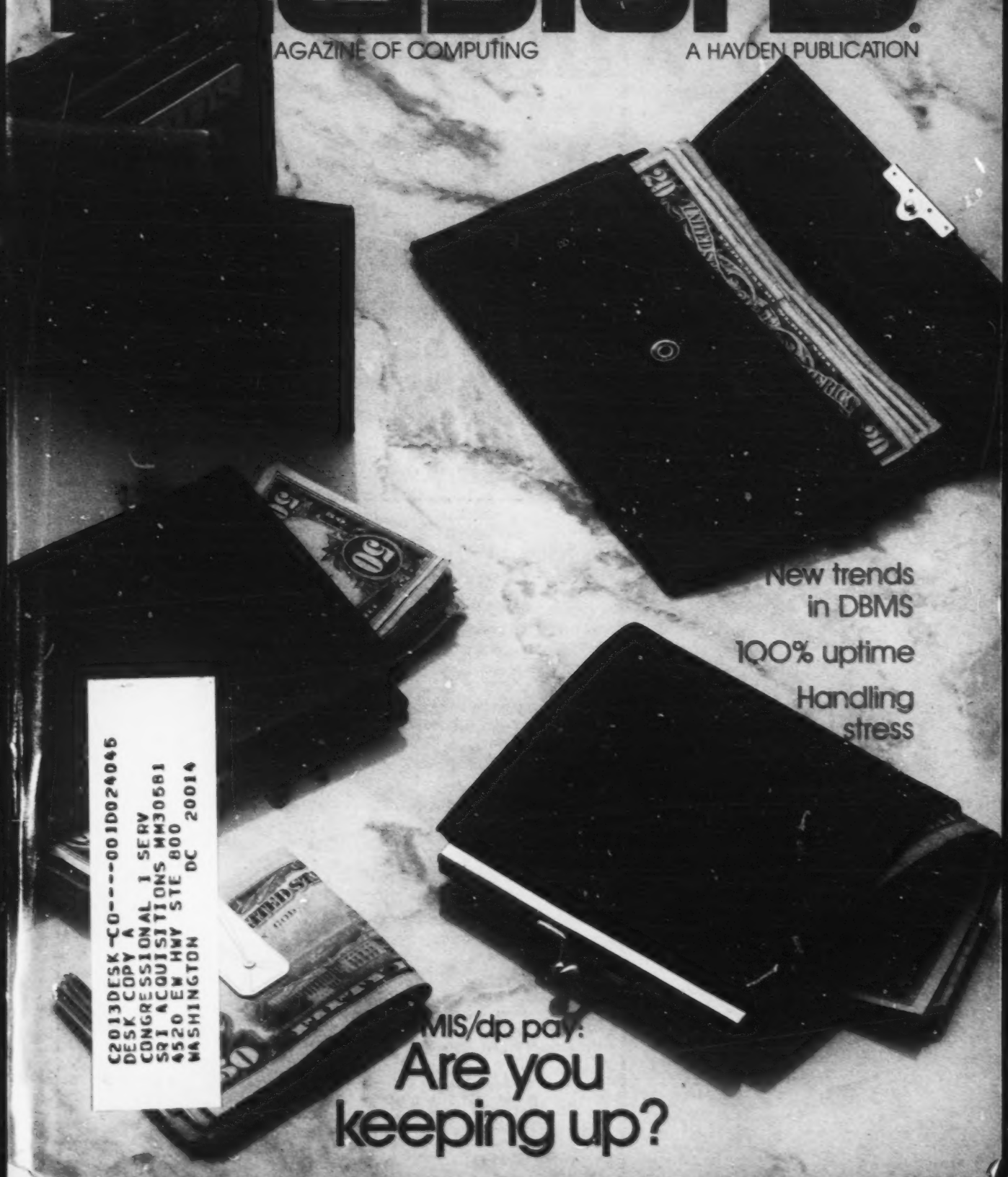
-/ C 4485-1 A -

COMPUTER DECISIONS

FEBRUARY 1982

AGAZINE OF COMPUTING

A HAYDEN PUBLICATION



New trends in DBMS

100% uptime

Handling stress

MIS/dp pay:

Are you keeping up?

C2013DESK-CO----001D024045
DESK COPY A
CONGRESSIONAL 1 SERV
SRI ACQUISITIONS MM30581
4520 EW HWY STE 800
WASHINGTON DC 20014

COMPUTER DECISIONS

THE MANAGEMENT MAGAZINE OF COMPUTING

FEBRUARY 1982

Volume 14 Number 2

Copies Printed: 124,473

Features

84 Before you reach your breaking point/ Martin Lasden

100 New trends in DBMS/ Jan Snyders

136 Remotivating staff after a project aborts/ Phillip and Kathryn Good

142 Managing media/ Owen K. Darrath

154 Business Systems Planning: Management of information/ Robert R. Orsey

160 MIS/dp pay: Are you keeping up?/ David Whieldon

176 Staying up 100%/ David Kull *A roundtable*

200 Planning a successful network/ James F. Kearney

Application

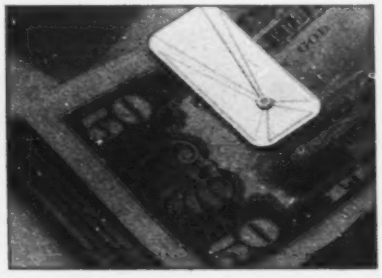
216 Liquor and software mix well

224 Seek knowledge with Intellect

237 Insurer claims efficiency

84

160



176

Columns / Departments

8 INSIGHT
12 NEWS & COMMENT
42 SNYDERS ON SOFTWARE
59 DATA COMMUNICATIONS
72 APPLYING MICROSYSTEMS
76 FOLLOWING THE LEADERS
78 COPING WITH VENDOR PLOYS
80 OFFICE AUTOMATION
215 CURRENT PRACTICE
222 YOUR CAREER
228 LETTERS
238 BOOKS
242 SPOTLIGHT
246 DATA-COMM EQUIPMENT
256 PERIPHERALS
260 SYSTEMS
264 ACCESSORIES
268 MICROSYSTEMS PLUS
276 OFFICE EQUIPMENT
278 SERVICES
280 SOFTWARE
296 ADVERTISER INDEX
297 SUPERMARKET
COVER: Kosoff/Butensky

by Eric R. Bashford

FOLLOWING THE LEADERS

Competition intensifies in burgeoning wp industry

The word-processing industry is one of the most dynamic in office equipment and is likely to grow at a compound annual rate of 30 to 35 percent during the next five years. Some 325,000 word processors will be shipped this year. The market could reach 1.3 million units—and revenues $10.5 billion—annually by 1985.

Competition is increasing as companies scramble to cash in on the market's rapid growth: The field now includes over 100 participants. New contenders are expected to enter the market in the near future.

Despite the intense competition, two relatively small companies, CPT Corp. and NBI Inc., have captured significant shares of a market dominated by such giants as IBM, Xerox, and Wang. MSRA Inc. has just published analyses on both companies, identifying and examining those factors that contributed to their success.

Both CPT and NBI have grown dramatically in recent years, far outpacing the industry growth rate. CPT's revenues jumped from $2 million in 1973 to over $100 million in 1981, while NBI's leaped to almost $60 million in 1981 from $2 million in 1977.

In the next few years, the relative sales growth of various generations of word-processing products may vary significantly. The market is in the midst of an evolutionary change away from a preponderance of hard-copy standalones toward display standalones and multi-terminal systems. These could each command 40 percent of the installed base by 1985. Electronic typewriters, however, may show only modest expansion because their prices include a high proportion of electromechanical content, which is not subject to the dramatic price/performance increases of electronics.

However, the markets may be less definable. Customers will increasingly add telecommunications, utility programs, and other features to their word processors to save time and effort. This variety of uses will tend to blur the distinction between word processors with data processing capability and micros and minicomputers that perform text-editing.

Price competition in the industry, especially for the lower-end standalone units, has increased substantially since last year's introduction of the IBM Displaywriter and Wang's Wangwriter. Research estimates that the average cost per word processor will decline 6 percent this year to $10,700, and is likely to fall to $9,300 next year.

Both CPT and NBI have sought market niches to protect their growth margins from the competitive storm. CPT has cut prices of its low-end product by 22 percent since the Dis-

Estimated worldwide word-processing shipments

	Shipments (units)	Increase	Value (millions)	Increase	Average value per units
1976	70,000	27%	$ 900	25%	$12,860
1977	90,000	29	1,150	28	12,780
1978	120,000	33	1,500	30	12,500
1979	165,000	38	2,000	33	12,120
1980	235,000	42	2,700	35	11,500
1981E	325,000	38	3,500	30	10,770
1982E	500,000	54	4,650	33	9,300
1983E	700,000	40	6,250	34	8,930
1984E	950,000	36	8,200	31	8,630
1985E	1,300,000	37	10,500	28	8,100

Source: MSRA, Inc.

playwriter announcement, but has also created the upscale 6100 and 8100 models which include added memory and features, and are priced at $1,000 more than their predecessors. Similarly, NBI is aiming its systems at the high end of the market and is concentrating on development of clustered products. For example, a simple NBI standalone System 3000 configuration sells for $13,900, while a multi-terminal System 8 sells for over $50,000 in an average installation. The sophisticated, multi-terminal System 64, which has not yet been shipped, might cost $115,000 fully configured. Obviously, both companies are jockeying for position in the higher-priced segment of the market.

The two companies have taken widely different approaches to marketing. NBI employs a direct distribution system, which concentrates on large accounts and is responsible for over 70 percent of sales. In contrast, CPT sells primarily to smaller regional firms through a well established dealer network.

According to an extensive end-user poll included in the reports, both NBI and CPT products are very favorably rated. However, user acceptance was less enthusiastic for CPT's WordPak auxiliary memory and users cited software and reliability problems with this product.

The reports, "CPT and the Word-Processing Industry, 1980-1985" and "NBI and the Word-Processing Industry, 1980-1985," are available for $400 each or $600 for both from MSRA Inc., 115 Broadway, New York, NY 10006. □

Eric R. Bashford is an analyst with MSRA Inc. in New York.

Could your laser printer do it?

WITH EONS of time, maybe.

But we couldn't wait. At Computer Language Research, we use high speed laser printers to run millions of razor-sharp tax returns and hundreds of illustrated user guides for our clients.

We needed programming as fast as the electronic laser printer. In fact, faster. So in the working environment of Computer Language Research, S'printer has evolved.

In the beginning, S'printer was just for us. But now 9700 users across the country are experiencing the S'printer advances:

- The speed and economy of a host-based system. Running on your mainframe computer, S'printer makes it possible for more than one staff member at a time to compose multiple pages of text and forms ... while your 9700 keeps right on printing.
- Unlimited control of font utilization. (A digitized font and logo modification system provides a great variety of sizes and styles — instantly.)
- Fast, simple commands for text editing. (Suited for lesser skilled personnel.)
- A full complement of streamlined forms commands. (Exceptionally friendly user coding.)
- Powerful graphics capabilities without pasteup! (Circles, parallelograms, graphs, grids, free forms, embedding...)
- Fast, easy alterations and updating. (Relocatable coordinates allow changes without measurements or respecification of current line coordinates.)

If you have an electronic laser printer ... and you want to produce volumes of forms, technical manuals, personalized direct mail, catalogs, policies, and other documents...

If you want instant CALCOMP reproduction...

If you want the efficiency of state-of-the-art technology in a simple package...

If you want it all — yesterday...

S'printer is your natural selection.

Call today, for a demonstration that will run circles around the dinosaur.

S'PRINTER

Electrostatic laser printing — brought up to speed

Running ahead.

Computer Language Research, Inc
2395 Midway Rd.
Carrollton, TX 75006
214-934-7285

Attn: Bill McClain,
Sales Representative
Computer Language Research
P.O. Box 400070, Dallas, TX 75240-0070

I WANT state-of-the art efficiency from my electronic laser printer. Tell me more about S'printer.

Name _____
Title _____
Company _____
Address _____
_____ Zip _____
Telephone _____

CIRCLE 53

MIS/dp pay: Are you keeping up?

Despite the nation's economic woes, MIS/dp managers are rather well compensated, directly and indirectly, according to our latest Salary-Status Survey. And they're looking to do even better.

by David Whieldon

Would you trade places with this MIS/dp manager, if other conditions of work were satisfactory?

He or she:

- Is earning $34,541 annually in salary.
- Is the top person in MIS or dp for the organization.
- Got a raise of between 8 and 10 percent within the past year, in the same job.
- Feels that pay is not keeping up with inflation—and would move for an increase of about 20 percent in salary.
- Works with an MIS/dp budget of about half a million dollars.
- Supervises 10 to 19 employees.
- Is content with his or her situation, on the whole.

This brief profile fits the typical MIS/dp manager responding to The *Computer Decisions* Salary-Status Survey in the fall of 1981. ("Typical" here indicates the median, or middle figure, in each category of data.) Thus, half this magazine's readers, who aren't doing quite so well, may be sighing, whereas the other half, who are doing better, may well be smiling.

And here's a flesh-and-blood representative of survey respondents, presiding over an IBM 4341, IBM 370/148, and a DEC PDP-40 for a manufacturer is northern Illinois: This dp manager earns between $30,001 and $35,000 and is fairly content in the position, but reports being concerned about salary, advancement, and work environment. Still another concern is keeping up with inflation, the most recent pay increase being in the range of 5 to 7 percent. Now supervising one to nine employees, this respondent is interested in getting into general management, for "expanded opportunities."

In one important respect, however, this manager is anything but typical: It's a woman who's recorded this information! Indeed, only 6.6 percent of participants in the survey are female managers. But because so many women have entered the ranks of information workers, it's certain that more will show up in managerial posts, as they prove themselves and overcome prejudice. Like the typical respondent, male or female, the Illinois resident is in her 30s and has spent 11 to 15 years in dp, thus being in a position to grow into even better jobs.

A chance to grow and earn more may well be the reason that nearly half those answering the question on willingness to move into general management say yes (49.4 percent). And maybe that's why so many—nearly nine out of 10—would jump ship if adequate incentives were offered. Leading the list of such incentives is an increase in pay, by the testimony of an overwhelming majority.

(And, incidentally, the respondents believe that salaries and increases are effective in dealing with

Salary-Status Survey

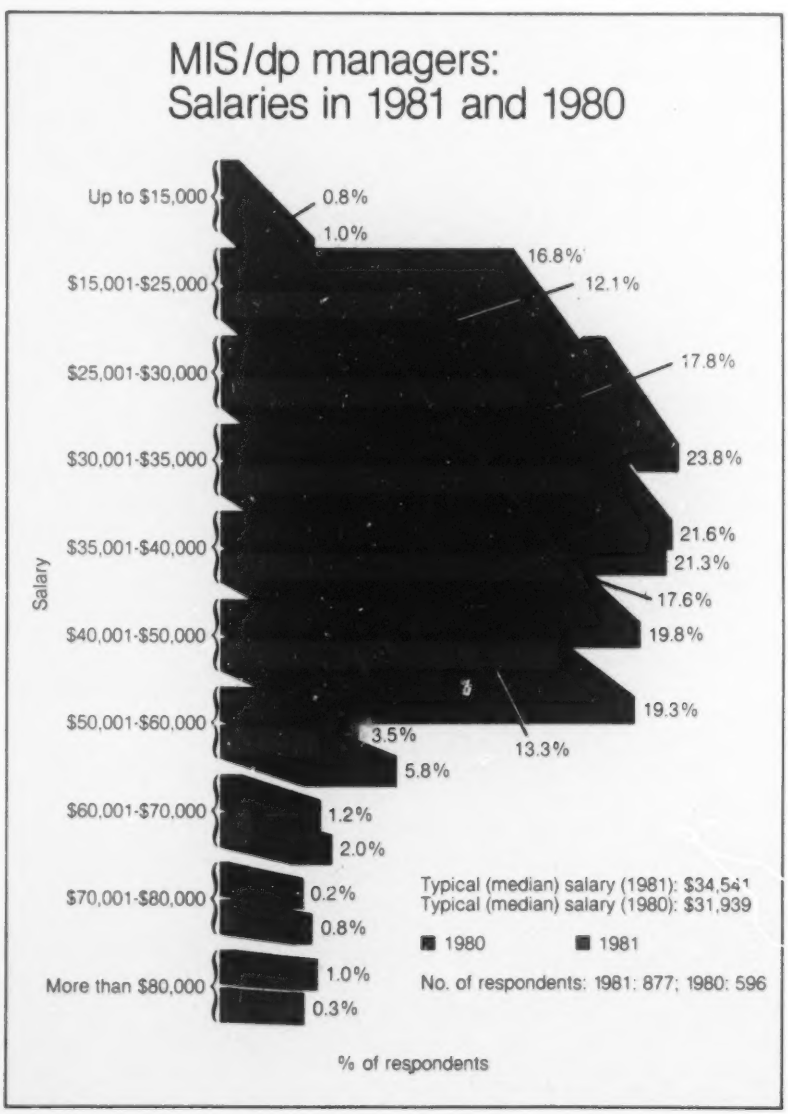
(Continued from page 161)

subordinates. Nearly three of five completing questionnaires voted for them when asked which factors motivate employees to perform well and stay put.)

Salaries—midrange, high, and low

The typical manager reporting in the latest survey has done better than in previous years. (In fact, the median salary was about $2,500 higher in 1981 than in 1980, or a little more than 8 percent.) Most MIS/dp managers fall principally into five pay categories, as shown in the box that accompanies this article. Specifically, 90.3 percent of respondents earn from $15,001 to $50,000 annually. One in five makes $30,001 to $35,000; an additional 20 percent are in the next higher $5,000 range; and still another 20 percent fall into the $40,001 to $45,000 bracket.

If most of the persons replying to The *Computer Decisions* Salary-Status Survey occupy the middle ground of compensation, then who are those at the extreme ends of the salary spectrum? First, let's go topside, where only three of 877 respondents report incomes of more than $80,000. One of them directs dp operations for a southwestern bank with an MIS/dp budget of $20 to $30 million, five IBM mainframes, and 24 smaller processors. His other responsibilities include ddp, data communications, office automation, local networks, and large databases. Moreover, his list of benefits and perquisites includes almost every category printed on the questionnaire. What more could he want? Though he feels his compensation is somewhat better than other managers in his organization, he'd still be interested in moving up into general management or moving on to another organization. If he left his present employer, the new one would have to give him a pay boost and a challenge, he says.



At the low end is a young midwesterner who supervises a small staff in a community mental-health program. He reports his earnings as $15,000 or less, but despite that very modest remuneration, he's quite content with his work and enjoys taking responsibility. Nonetheless, as a family man, he wouldn't mind moving to another organization—he's been in MIS for a year—if he could get 14 to 16 percent more money in addition to paid relocation benefits.

Like him, many other respondents whose paychecks are small are relative newcomers, with less than five years in MIS/dp. Many are young, in their 20s; have job-hopped more than their seniors; or are working in government (outside the federal establishment), wholesale-retail trade, or education, where pay traditionally isn't as high as in manufacturing or finance.

It's no secret that the kind of organization a manager finds himself in determines what he can earn, at least in some degree. On the whole, this time around, government and the military, manufacturing enterprises, financial institutions, and wholesale-retail trade reward MIS/dp personnel well, compared with education. (The amounts, as

Salary-Status Survey

(Continued from page 162)

shown in the accompanying table, run in that order from top to bottom.) A typical MIS/dp manager in manufacturing, for instance, reports income of $34,773, while in education the median figure comes to $30,522.

If you want to improve your salary, you should gravitate to an organization with a larger budget. (At least, that's one tactic you might pursue.) Though that may hardly seem a revelation, the data in the survey show a marked correlation between managers' salaries and the budgets they deal with. For instance, a manager earning between $25,001 and $30,000 is typically working in an organization with a total MIS/dp budget of $218,000. Farther up the scale, someone with a salary of between $40,001 and $50,000 is located in an organization spending $1,850,000. In the next higher salary category, $50,001 to $60,000, the median budget is almost double that.

As for the kind of money that MIS/dp managers have to work with on the job, the typical—or median—amount is about $500,000. About 10 percent of respondents have but $200,001 to $300,000, though about 10 percent are responsible for $1,000,001 to $2 million and another 10 percent administer $2,000,001 to $5 million. Thirty-nine managers out of 877 who replied report more than $40 million each in their budgets, and 16, at the low end, spend less than $20,000 for their organizations.

At the same time, other kinds of remuneration besides salary come in for frequent mention. For example, if a pension can be considered a payment postponed for a time, then 85 percent of all respondents are benefiting. About one in four among them gets cash bonuses, and about one in six, stock options. A majority—sometimes an overwhelming majority—enjoys such reimbursements as medical- and dental-insurance payments and education assistance. But bonuses and stock options are benefits of a different stripe, and they'll be considered in the next article—along with lesser benefits and perquisites—in the March issue of *Computer Decisions*.

Changes in profit-sharing and pension plans are under way, according to Douglas Dietrich of D. Dietrich Associates Inc. In his company's studies of executive compensation, he's detected "a shift away from pension plans and toward profit-sharing programs." Speaking from Phoenixville, PA, Dietrich says, "There's a 5 to 10 percent movement in that direction, and that's significant in one year. With a tighter squeeze on profitability, companies may be trying to get out of the fixed liability of pension plans and seeking more flexibility."

If incomes of managers are up from last year, according to The *Computer Decisions* Salary-Status Survey, then that implies that most are getting regular increases in pay. The data support that assumption: Indeed, 865 of the 877 respondents reported an increase during the previous year, and 79 percent of those answering said they got raises in the jobs they've been holding. Only a few reported obtaining increases by promotion, moving, or other means. That suggests strongly that most respondents are being better compensated by staying in their present positions, even if they sometimes look longingly at greener pastures elsewhere.

As everyone knows, inflation is making inroads on income and assets. In the 12 months just before *Computer Decisions* readers filled out questionnaires (September 1980 to September 1981), the inflation rate was running about 11 percent overall. Of the readers responding, fully two-thirds are worried about inflation, believing that their salary increases aren't keeping up. Typically, respondents received 8 to 10 percent increases in the last years, with the median figure at a little under 10 percent. One in six got only 5 to 7 percent raises, roughly half the 11 percent inflation rate. On the other hand, one in five did better than that, with 11 to 13 percent; almost one in four improved on that, with increases of 14 percent or more. On the whole, however, we must conclude that most managers have been losing ground to inflation, if we assume that they've received increases once a year.

Quite a few managers replying to the salary-increase questions indicate that, even with their most recent increases of between 8 and 13 percent, their compensation isn't

How salaries stack up

Below are the medians, or middle salary figures, for five categories of organizations in which survey respondents work. (There were too few questionnaires from managers in insurance, medicine-law, transportation, construction, and utilities for statistical validity). One surprise is that government-military managers of MIS/dp rank so high this time; a year ago, respondents on government payrolls were earning less, on the whole, than manufacturing and finance managers. The median salary this year may be skewed a bit by a heavier response from the federal government and the armed forces, as opposed to state, county, or municipal agencies, where pay tends to be lower.

Kind of organization	Median (middle) salary
Government, military	$36,112
Manufacturing, processing	34,773
Finance	34,375
Wholesale-retail trade	33,750
Education	30,522
All organizations	34,541

Salary-Status Survey

(Continued from page 164)

keeping up with inflation. A data-processing manager working for an insurance carrier in Minnesota got an increase of about 27 percent by moving, but he maintains that his new compensation still isn't sufficient to beat inflation.

During 1980, the pay and bonuses of top business executives generally kept pace with inflation, which ran at a rate of 13.6 percent during that year. According to the accounting firm of Arthur Young & Co., executive pay rose at a rate of 14 percent.

Movin' on: Does it pay?

Job-hopping may be quite advantageous to young workers in dp, particularly programmers, whose skills are in high demand. But switching frequently doesn't do so much for the managers sampled in The *Computer Decisions* Salary-Status Survey. Indeed, there's a lot of evidence that staying put—making oneself known, building a department, succeeding in long-range projects—does considerably more to increase the figures on a paycheck. The typical manager has held only two jobs in the past 10 years, though, at the same time, about one in three has held three or more in that period. Ninety percent of the respondents received their most recent increases in the same organizations worked for when filling out questionnaires, as opposed to moving or taking some other action to get more money.

MIS/dp managers show relative satisfaction with their present posts, too: When asked how their salaries stack up against those of managers with comparable responsibilities in other departments, 40 percent of the respondents said that their compensation is better. Another 41 percent testified that it's about the same as other managers'. (The respondents feel generally more positive about salaries, in comparison with other kinds of managers, than they do about benefits and perquisities, influence in the organization, and advancement opportunities.)

Moving to another company is important to career advancement, claims a dp manager in a northern California city. Like the typical respondent, he's worked for two organizations in the past 10 years, and his present employer is a manufacturer with sales between $25 million and $50 million yearly. "There aren't monetary incentives to stay long-term with any single organization," he comments at the end of his questionnaire. "This makes job-hopping almost mandatory to advance financially." His salary *is* a bit below par, in the range of $25,001 to $30,000. So would he move up or on to improve it? Definitely, he indicates: He'd like to get into general management and could be prevailed upon to go elsewhere, provided there was a pay increase and greater challenge in it.

Though the survey respondent typically got 8 to 10 percent more for his last raise, he or she would need more to sign up with a new organization. In fact, the new employer would have to ante up 20 to 22 percent more than the manager is earning now; almost one in three of those replying in the survey would want that much to move. That's certainly not surprising in light of today's high costs of moving and switching houses—if they're involved—as well as the wrench of pulling up stakes and settling into a new community.

Salary, or more correctly, a boost in salary is a critical factor in making a move to another organization, according to survey participants. Almost four-fifths of them indicate that an increase in pay would be an incentive in inducing them to transfer. But other incentives also get high marks: Profit-sharing is attractive to 44 percent, bonuses to 41 percent, and stock-purchase plans to 30 percent, among the lures that produce immediate or near-term financial benefits.

Besides an increase in pay, only one other incentive would lure a Maryland dp chief away from his job, where he earns more than $40,000 annually. That incentive would be "greater procurement authority." His questionnaire shows that he works in government, where he finds procurement the most wasteful of his activities.

(Continued on page 170)

Who got questionnaires?

Altogether 4,850 salary-status questionnaires showed up on the desks of MIS/dp managers on the *Computer Decisions* circulation list last fall. They had been selected randomly by computer from among *Computer Decisions*' 117,000 subscribers. In short, if you held a manager's title or one that was essentially the same, the odds were roughly one in 10 that you'd have received a blank form to fill out.

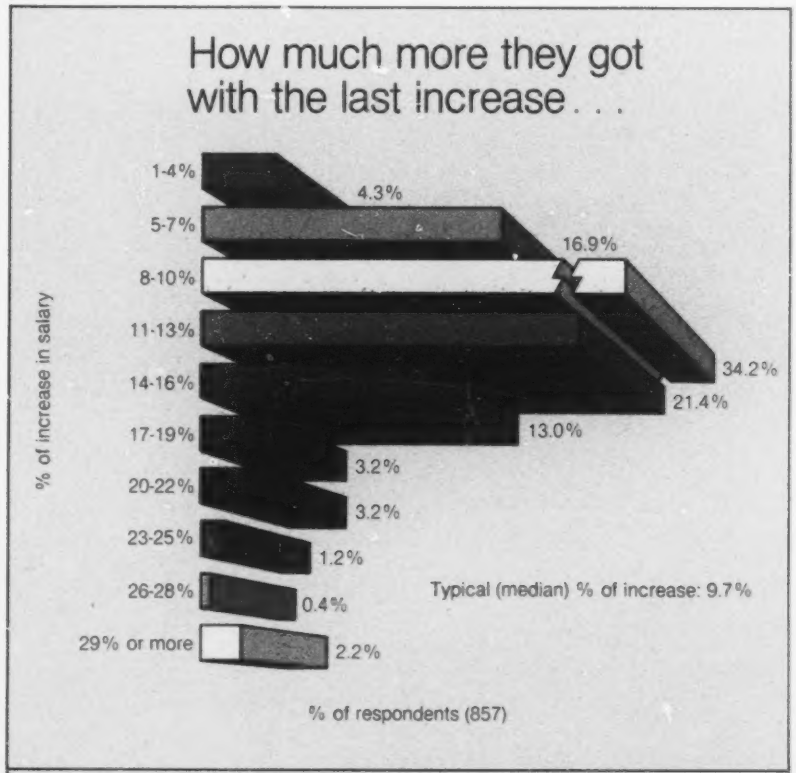
As mentioned in the text, the response to the recent *Computer Decisions* survey was excellent: No fewer than 877 readers filled out four-page questionnaires of 39 questions each, for a response rate of 18 percent, substantially better than last year's healthy 12 percent return. That degree of interest on the part of readers makes the results statistically valid and projectable.

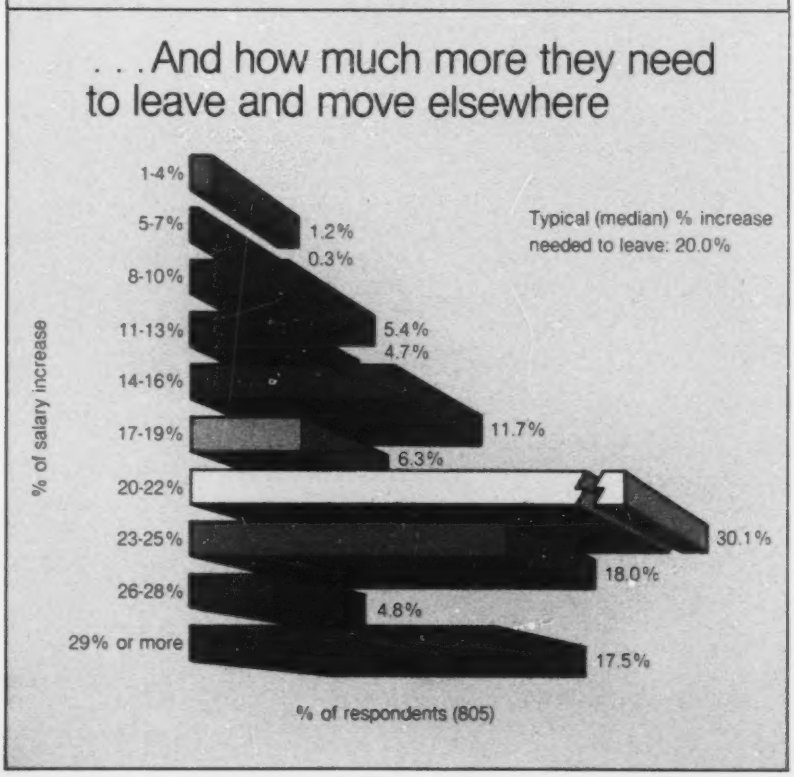
(By contrast, another computer magazine's 1981 salary survey was based on 300 returned questionnaires out of an unreported number of questionnaires mailed. And the salary figures were scattered over 47 job categories. The *Computer Decisions* survey covers only managers in MIS/dp.)

Please note, however, that, as might be expected, not all respondents answered all questions. So for any given question, somewhat fewer than 877 may have provided information; the actual number answering is indicated in each bar chart.

Salary-Status Survey

(Continued from page 166)





There's nothing unique about longing for a "position with more autonomy and a chance for more recognition," in the words of a Colorado systems and programming manager. But he adds this fillip: "A chance to build a dp organization from scratch."

A new issue for managers and executives has just come into being in recent months. According to personnel recruiters quoted in *The Wall Street Journal*, many big-company executives are willing to leave for more responsibility in small companies. Do MIS/dp managers conform to this trend? This magazine's survey gives a hint: Respondents who aren't already in the top MIS/dp job were asked if they'd leave to be chiefs in other companies. Of those answering the question, two-thirds reported that they would make such a move.

Movin' up: more alluring than ever

The desire for upward mobility was stronger among MIS/dp managers last fall than a year before, according to The *Computer Decisions* Salary-Status Survey. Now 49.4 percent of respondents say yes, they'd like to move up and out of MIS/dp management into general management. That contrasts with 39 percent who expressed the same desire in the fall of 1980.

A California dp manager, who grumbles about slow advancement and slow salary increases, states that he's interested in moving into general management: "I enjoy making critical decisions," he explains. "It's a high!"

MIS is viewed by some respondents as an opportunity sector. (There is a minority report—"I see MIS management as a dead end"—from a New Yorker.) Indeed, one MIS manager from Ohio, though ambitious, likes what he's doing a lot: "Although I want to move into general management, I feel that the challenges of MIS are the most exciting and rewarding of any in the company."

Another MIS manager, however,

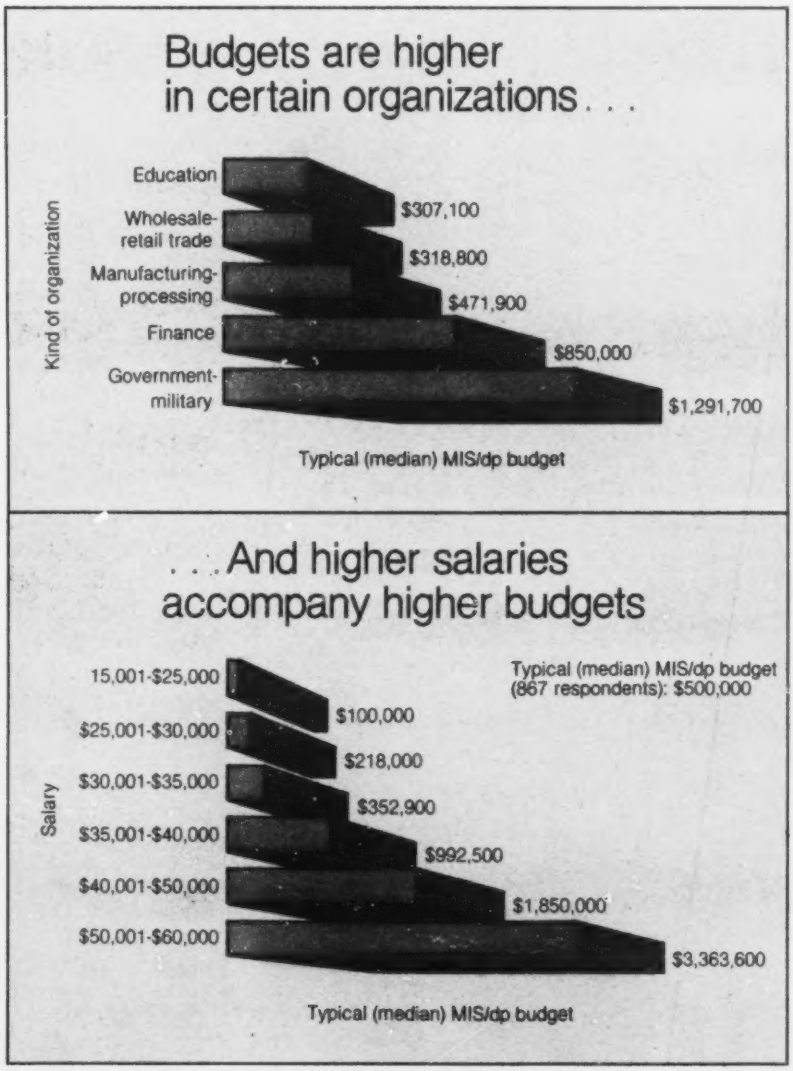
Salary-Status Survey

(Continued from page 170)

is uncomfortable with his situation because he lacks opportunities to get pay increases and to advance. A self-made man who started as an operator, he recites a familiar tale of woe: "I'm being held back by the controller, who lacks understanding of dp, although I report directly to the president of the company."

Steven Langer of Abbott, Langer & Associates in South Chicago Heights, IL, addresses the question of dp persons rising in the organization. "Three traditional roads lead to top management," he states, "and they're finance, manufacturing, and sales. It's the vice president of one of those who ends up as chief executive officer. If a dp manager wants to reach the top rung, he has to move out of dp into the more general financial area, and that may be a problem." But the industrial psychologist has suggestions for the ambitious: "It pays, for example, to adopt the norm of dress for executives in the organization," Langer continues. "Computer people's interpersonal communication skills aren't particularly good, but they're necessary for moving up the managerial hierarchy. Taking part in a Toastmasters group would be useful, as would taking up avocations that are people-oriented, rather than playing computer games. It would be good to pick up more general business skills, particularly in accounting and finance. I'd suggest working toward an MBA."

And Langer adds one more point: "The dp manager should sell his product better. He or she starts by selling himself then selling the product. You can't swamp operating managers with data, but you can demonstrate to them the value of the information with, say, a highlight report as a preface to a full computer-generated report."



Generally content

All this talk of moving on and moving up shouldn't be interpreted as meaning that MIS/dp managers are an unstable, restless lot. When the respondents were pinned down by a direct question, they showed themselves to be relatively content with their present jobs when marking off points on a "happiness" scale. Three out of five placed themselves above the midpoint in the direction of contentedness. Indeed, 20 percent said they were quite pleased with present jobs, and only a little more than 10 percent were unhappy.

A surprising number of survey participants mention that making users happy or developing their subordinates is a source of pleasure. Though many managers certainly find working with hardware and software a lot of fun—and may prefer it to working with people—many others obviously relate well to others. It speaks well for MIS/dp managers that so many derive real satisfaction from serving others in their organizations and watching projects move to successful conclusions.

One man's meat or drink is another man's poison, however. So it is in dealing with colleagues within the organization. The activity giving the most satisfaction, says one, is "communicating in English to non-dp-ers." By contrast, the most wasteful of time and other resources, in the words of another, is "com-

(Continued from page 172)

munication with non-dp people."

From a Pennsylvania manufacturing company, the MIS director volunteers: "Overall, it's been a very satisfying career because I've been able to work with a variety of people representing various departments of the companies for which I've worked. There have been many opportunities to contribute directly to the success of those companies."

But from frequency of mention on questionnaires, managers are sensitive to what they perceive as a lack of recognition, opportunity to advance, and proper rewards. Some feel that corporate executives don't appreciate how valuable data processing and management information are to operators. Or older and more traditional executives fail to understand the potential of new applications. Thus many of the respondents seek to move into general management so they can exercise more influence or control over what happens in their organizations and perhaps extend the role of automation. (Some, of course, simply want to advance, earn more, broaden skills, or take on more responsibility.)

Lack of appreciation, salary increases, and advancement is widely felt by managers and executives in industry as a whole, not just in dp. That's the contention of Dietrich, who says that companies sensitive to keeping employees satisfied have developed programs of employee evaluation, advancement, and career-path development at all levels. "It's a long-term investment in personnel, and management must be committed to make things happen. A career-path program features maintenance agreements for people, much like the maintenance agreements for computer equipment. (For more on career paths, see "Scenario for Suc-

Worry-Free UPS Power Protection

"It's our insurance policy. We've been more than satisfied with LorTec UPS performance in this critical application."

Bob Kirkpatrick
Director of Communications
Northwest Orient Airlines
St. Paul, Minnesota

Processing over 14,000 calls a day, Northwest's Minneapolis Reservations Center depends on an Automatic Call Distribution System for switching and control. As system reliability is critical, a 30 kW LorTec UPS insures system operation, 24 hours a day.

Ours Works!
LorTec UPS — 16 years of documented, worry-free, UPS dependability. But don't take our word for it. Ask any of our customers. You'll find all their names, addresses and phone numbers in our new "UPS Reliability Discovery Kit. Or, call Tom O'Neill, Vice President at 216/327-5050.

LorTec UPS units are available from 12.5 kW to 125 kW; 50 Hz and 60 Hz

LORTEC

LorTec Power Systems, Inc.
5214 Mills Industrial Parkway
North Ridgeville, Ohio 44039

CIRCLE 97

Getting ahead

"Widen your interests beyond computing," advises Myron R. (Mike) Parr, president of Source Edp. "Take an avid interest in the profit potential of your company, and the business itself. You should be well-rounded, recognizing the importance of interpersonal relationships." Parr, who was a director of computing for a large company before his stint with the personnel-services company, adds that he sees bright prospects for computer people who are more interested in the business than in

cession" in last month's issue.)

The management of one company in Silicon Valley has made a commitment to its employees, giving them responsibility and allowing them to make decisions that affect their work. "The employees feel that they're making major contributions to the company, and they're quite content with management," explains Dietrich, "yet the company is one of the lowest-paying in the country."

It's clear from statistical results that most respondents are generally content with their lot. But in replying to open-end questions, they voice the concerns and annoyances of work life. In addition to lack of recognition, many worry about staying up to date. A Michigan manager, in manufacturing, lists his three principal concerns: "Change, change, change."

Aside from advancement and salaries, the other concerns of those participating in the survey come down to many familiar items such as schedules, planning, work conditions, politics, users, employees, budgets, and security. Just getting along with people well is a basic managerial challenge.

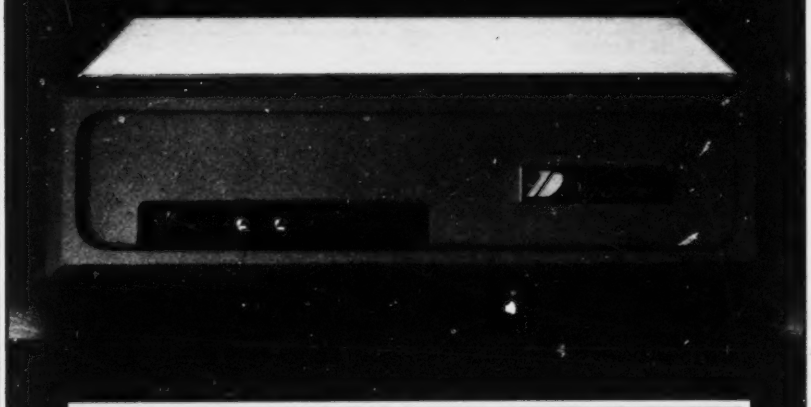
Downright wasteful activities, on the other hand, are often those that characterize organizations of any size: meetings, committees, paperwork, telephone conversations, and administrative chores generally, not to mention system failures, poor designs, and procurement problems.

In the last analysis, if your compensation, working conditions, and satisfactions measure up to those of a second-in-command manager from Fort Worth, TX, you're blessed indeed. His overall conclusion goes like this: "The sparkle never seems to leave dp. It moves. It's the future. It's more of an avocation than a vocation. This is where it's at!" □

the profession.

Source Edp offers counseling to job-hunters and publishes listings of openings and salary surveys. (For 1981, median salaries over 12 kinds of managerial posts in MIS and dp varied from $24,700 to $52,700.) Its latest full report, "1981 Computer Salary Survey and Career Planning Guide," is available to qualified computer professionals without charge. Write to Source Edp, Department DZ1, 2 Northfield Plaza, Northfield, IL 60093.

Success Story.



Digidyne's complete line of Data General compatible computers and controllers can save OEM's up to 50%.

Thousands of our CPU's are working hard for successful OEM's throughout the world. Our complete line of DG compatible computer and peripheral control units will put the profit margins back into your systems configuration, too.

Digidyne's D-832 computer features parity check and detection, power fail/restart, multiply/divide, self-contained diagnostics, auto-load programs and a "set and forget" switch register. Contained in a 5-slot front loading chassis with virtual control panel and power supply, our D-832 is $1770 in OEM quantities.

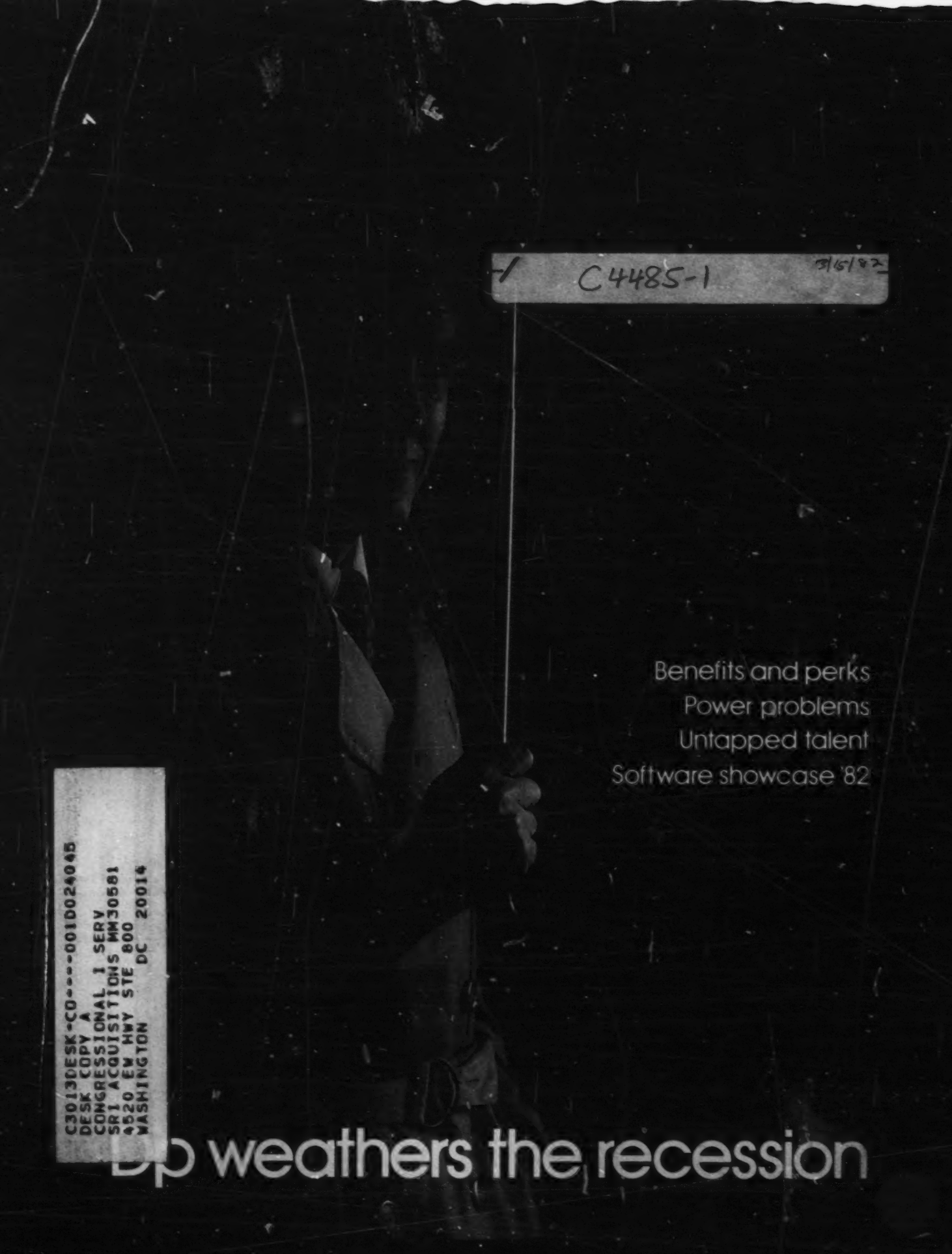
If you need more memory, Digidyne's D-864 computer offers expansion capabilities to 128K bytes of directly addressable memory on a single board . . . only $2525 in OEM quantities.

Make our success your standard feature. Call us outside California toll free, 1-800 854-1961.

Digidyne

Digidyne Europe, Ltd., 9 The Crescent, Leatherhead, Surrey, England, (44) (3723) 78583

CIRCLE 98



C4485-1 3/6/82

Benefits and perks
Power problems
Untapped talent
Software showcase '82

C3013DESK-CO----001D024045
DESK COPY A
CONGRESSIONAL 1 SERV
SR1 ACQUISITIONS MM30581
4520 EW HWY STE 800
WASHINGTON DC 20014

Dp weathers the recession

COMPUTER decisions

THE MANAGEMENT MAGAZINE OF COMPUTING

MARCH 1982

Volume 14 Number 3

Copies Printed: 126,323

Features

61 **Got a good cost-cutting idea?/** *Have you found any clever or ingenious ways to cut your dp costs? A questionnaire for CD readers.*

86 **More than money/** David Whieldon *MIS/dp managers respond well to familiar motivators, and some of the less common and tangible items, according to Part II of our Salary-Status Survey.*

94 **Dp weathers the recession/** David J. Kull *While some MIS/dp shops suffer through the slump, others shine by easing their parent organizations' straits.*

102 **When power problems strike/** David Whieldon *Dirty and interrupted power slows jobs, idles personnel, damages dp equipment, and wastes money. Know the remedies and how to apply them.*

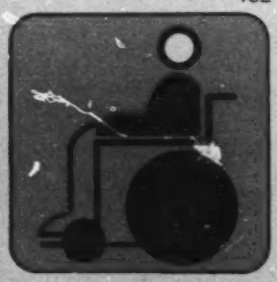
132 **Untapped talent/** Martin Lasden *Handicapped, elderly, and formerly incarcerated workers can contribute to your dp operation.*

140 **Software showcase '82/** Jan Snyders *There's packaged software to meet almost any need you can define. And the right package can really light up your life.*

178 **Machine dictation: It's a matter of time/** John Kirk *Hours saved add up impressively when a company drafts its messages via microphones.*

94

132



140

178

Columns / Departments

6 INSIGHT
11 NEWS & COMMENT
35 SNYDERS ON SOFTWARE
56 FOLLOWING THE LEADERS
62 DATA COMMUNICATIONS
72 APPLYING MICROSYSTEMS
74 COPING WITH VENDOR PLOYS
84 OFFICE AUTOMATION
211 YOUR CAREER
213 LETTERS
215 BOOKS
222 SOFTWARE
224 SPOTLIGHT
225 INFLATION FIGHTERS
227 ACCESSORIES
228 MICROCOMPUTERS PLUS
230 OFFICE EQUIPMENT
231 PERIPHERALS
232 DATA-COMM EQUIPMENT
234 SYSTEMS
235 SUPERMARKET
236 SERVICES
237 ADVERTISER INDEX

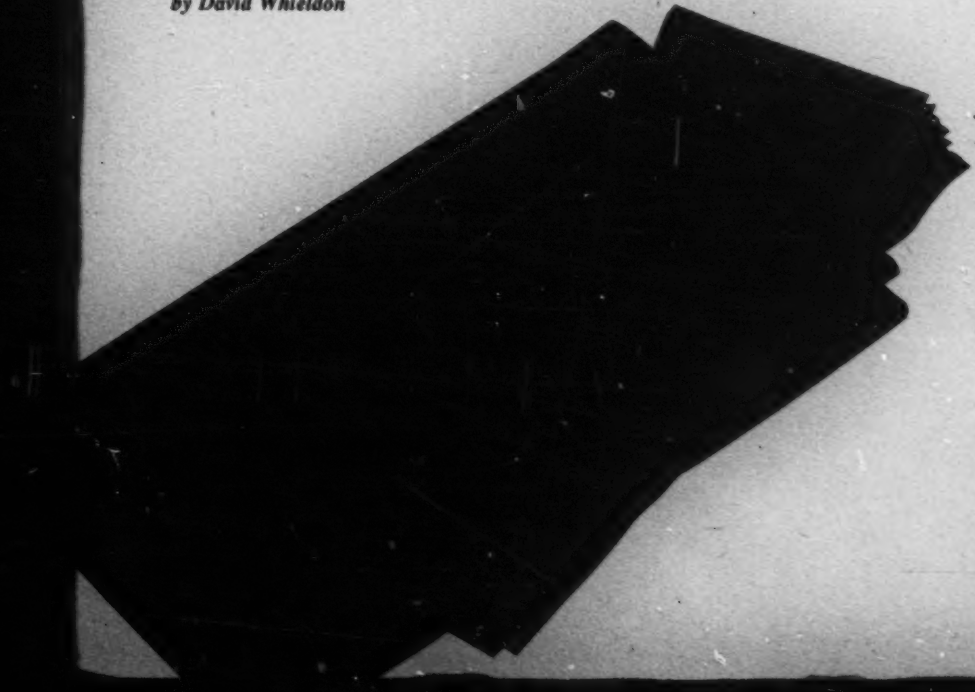
COVER PHOTO: Edward Hardin

THE *COMPUTER DECISIONS* SALARY-STATUS SURVEY—PART II

MORE THAN MONEY

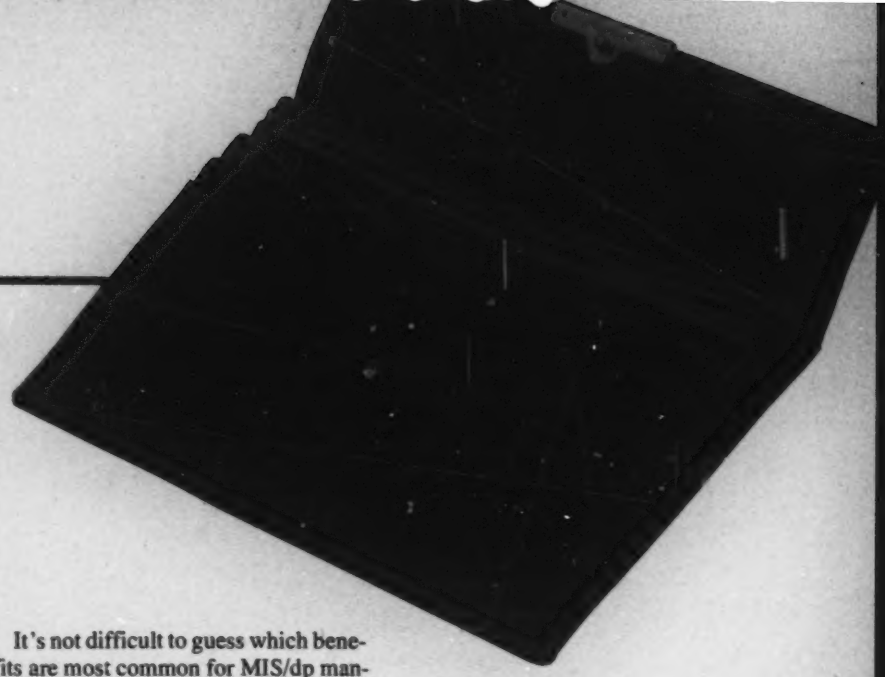
MIS/dp managers respond well to familiar motivators—insurance, pensions, educational help, a share of the harvest—and some of the less common items. They get "benefits" from performing well, too.

by David Whieldon



Last month the typical MIS/dp manager was shown to be earning $34,541 and had received an increase of 8 to 10 percent in salary within the last year in the same job. Nonetheless, he or she feels that pay isn't keeping up with inflation and would move to another organization for an increase of about 21 percent plus other incentives. That manager is the top person, usually, in MIS or dp in the organization and supervises 10 to 19 employees. In sum, though always looking for growth opportunities, the typical manager feels satisfied with his or her situation, on the whole.

The financial experts advise you to review your stocks, bonds, and money-market funds from time to time. But how long has it been since you looked hard at the benefits, perquisites, and incentives (BPIs) your employer offers?



Naturally, you can't recall all the details of plans you're a part of at work. But you've had enough experience with them to outline the benefits, perks, and other financial aids you enjoy. And certainly you could make a mental list of what you'd *like* to have if you could induce your employer to loosen up a bit or, especially, if you just went out and took another job.

Reviewing benefits is just what the editors of *Computer Decisions* asked a randomly selected segment of MIS/dp managers to do late last year. Their reports on insurance coverage, pension plans, educational assistance, moving benefits, extra holidays and vacations, physical exams, bonuses, memberships, profit-sharing, stock options, and contracts form the substance of this article. Chiefly, the figures tell what proportion of respondents receive which benefits, perquisites, and incentives. So you can compare how you're doing with how they're doing, several of the bar graphs accompanying the article allow you to check off boxes with a pencil, to evaluate the extras you receive. You'll probably find both satisfaction and displeasure in your share of the BPI pie.

Benefits are a very big item in any employer's compensation package. Could you guess, by the way, what they total, on average, in terms of dollars or percentage of payroll? For all employees nationwide, that is, executives, managers, and subordinate personnel, it comes to $6,084 each annually, or $2.96 per payroll hour. Expressed another way, benefits amounted to 37.1 percent of payroll, for the calendar year 1980. That's the finding of the U.S. Chamber of Commerce in its most recent survey of 983 companies in major industrial sectors. It goes without saying that managers fare better than other employees generally, especially as to profit-sharing, bonuses, and stock options—and perquisites, on which it's difficult to place a dollar value.

It's not difficult to guess which benefits are most common for MIS/dp managers. They include pension plans, health insurance, and educational assistance. Indeed, almost 85 percent of all respondents can look forward to pensions. Nineteen out of 20 get medical insurance, though not quite three out of five, dental insurance. Life insurance, on the other hand, covers 88.7 percent of managers reporting in. And assistance with education is available to more than 60 percent—not surprising in light of what MIS/dp managers are expected to know and how rapidly knowledge is changing.

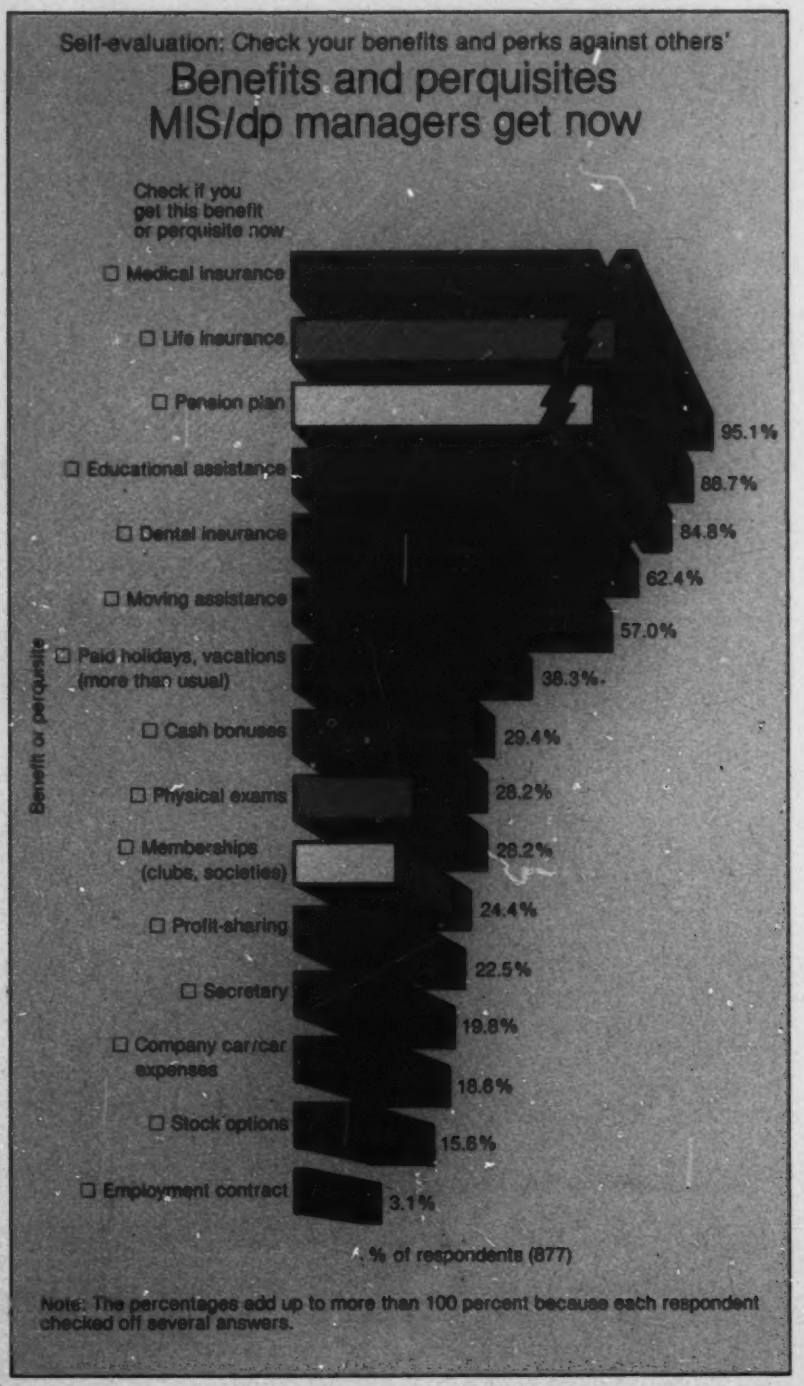
The terse comment from a Michigan man in regard to benefits and perks is that his portion is "not a hell of a lot!" And he's right: He checks off only the most common—medical and life insurance and educational assistance—from a list of 15 items. He presides over an IBM 370/138 shop and supervises 10 to 19 employees, but he's in wholesale or retail trade—a sector where pay and benefits are anemic.

According to Douglas Dietrich, optical plans—for eye exams, glasses, and the like—are starting to appear on the

(Continued from page 87)

benefits scene. "Optical plans are now about five years behind today's dental programs," he notes, "but dental benefits came from nowhere to become significant in just five years." Dietrich believes the impulse comes from the insurance companies. Offering a package to a company to pay for a new medical expense is another way of creating a market, he says. Dietrich operates D. Dietrich Associates Inc. (Phoenixville, PA), which performs executive-compensation studies.

Legal-insurance plans don't seem to be catching on, however. Perhaps it's because the average manager's family has more serious and expensive teeth problems than legal hassles.



Those less common benefits

Then there are the benefits, perks, and incentives that fewer than half those in the survey enjoy: moving expenses when relocating (38.3 percent); more-than-usual paid holidays or vacations (29.4 percent); physical exams and cash bonuses (28.2 percent); and club or society memberships (24.4 percent). Over one in five have profit-sharing, and one in six, stock options. A contract remains an unusual feature: Only 3.1 percent of the respondents serve according to a written agreement.

A few in the survey receive even more uncommon benefits. A dp manager in the south flies the company aircraft. A Michigan man, who works for a hospital, lists the "support of top management." And in Connecticut, a dp manager has "unlimited computer use," and a home terminal—so he can play games, solve his own problems, or solve company problems—and believes that employers should encourage, not inhibit, such usage.

Often, of course, benefits and perks reflect distinctive work situations: For instance, a female manager at an eastern phone company gets discounted phone service and long-distance calls. A middle-aged man who works in metropolitan New York counts company loans as a benefit—he works for a stock and securities transfer company. "Job security" shows up as a benefit on the questionnaire of a U.S. Army officer, while "access to university facilities" is valued by—you guessed it—a manager with an educational institution.

Rewards for short-term performance have inhibited strategic management, according to Louis J. Brindisi Jr., a senior vice president of Booz, Allen & Hamilton, the management- and technology-consulting company. As a

(Continued from page 88)

result, corporations are offering more long-term compensation packages, and stock options, which fell into disfavor in the 1970s, are making a comeback. "Stock options are once again respectable members of long-term incentive plans," writes Brindisi in a Booz, Allen quarterly. An optimum long-range plan for the 1980s should, he contends, combine stock options and performance bonuses.

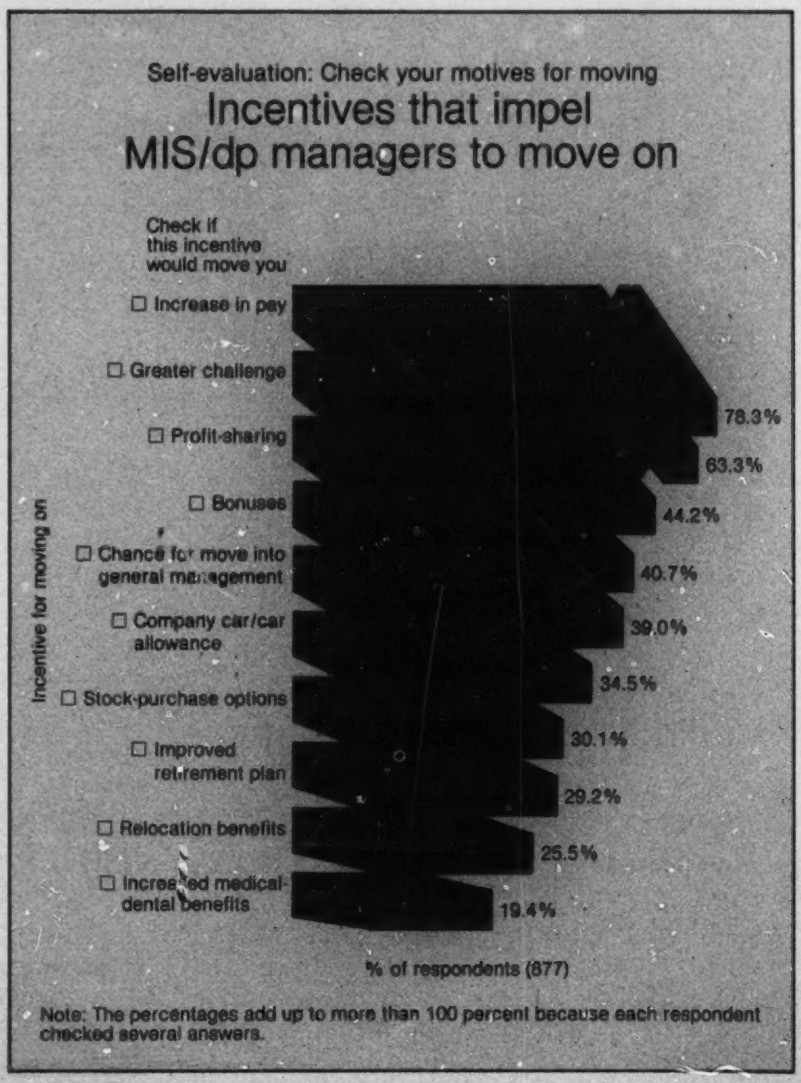
"More and more companies are seducing executives into staying put by offering innovative perks tailored to today's lifestyles," declares Martin Lasden, western editor of *Computer Decisions*. In a detailed article on benefits and perquisites in the November 1981 issue, he explains the highly attractive lures that organizations are dangling before information-industry managers and executives. For instance, a growing number of organizations are offering house-mortgage assistance, bonuses for taking a job and moving, low-interest or no-interest loans, stock options and grants, allowances for relocated working spouses, new-child-care leaves of absence for men, day care for children, elective rather than mandatory benefits (the option to choose one benefit, or more of one benefit, over another), flextime (flexible working hours), retirement counseling, car- and van-pooling, and preventive-medicine programs. (Tearsheets of Lasden's article, "Stay put for perks?", are available.)

Lasden also cites exotic perks calculated to satisfy the ego as well as more basic needs. A chauffeur-driven limousine for executives who make it to the top is one, and social-service leave, or paid time off for work in charitable or philanthropic organizations might be considered another. Other unusual offerings today, derived from other sources, include company housing for employees in California, where house and apartment costs are sky-high. Access to corporate aircraft and executive dining rooms, employment contracts, and important-sounding titles appeal to certain upwardly mobile men and women. And for some managers, take-home or keep-at-home terminals are perks.

According to a survey of Merrill Lynch Relocation Management Inc., job-seeking help for "trailing spouses" is a trendy benefit for relocated executives. According to investigators, 23 per cent of 603 major companies offer some kind of assistance to spouses of transferred employees. That help varies from paying employment-agency fees, through counseling of different kinds, to actively searching out appropriate job openings.

At one point in the questionnaire used for The *Computer Decisions* Salary-Status Survey, respondents are asked to sum up their feelings about benefits, perks, and other incentives, and compare their BPIs with those of other managers with similar responsibilities in other departments. Nearly two-thirds of MIS/dp managers feel they're treated about the same. However, 21.2 percent believe their BPIs are somewhat better or much better than those of counterparts outside MIS/dp.

As a postscript, it should be noted that man (and woman) does not live by bread alone. That's another way of saying that there are "benefits" of MIS/dp management that can't easily be quantified or even explained. Indeed, respondents find emotional or psychic



compensations in their jobs, and their comments on questionnaires give hints of how they find it: "Task completion" (Hawaii); "Challenge of new problems" (Texas); "Project development" (Connecticut); "User and executive satisfaction" (New Jersey); "Providing time-saving information or systems to a user" Washington); and "Managing people—and making a contribution to my staff" (Colorado).

Benefits from movin' on

One sure way to change the mix of benefits and perks you enjoy is to chuck your present job and sign on with a new employer. That could mean simply finding a more generous organization or maybe negotiating for a better package of pay and other financial incentives.

When asked if they'd move for sufficient incentives, an overwhelming majority of managers in the survey—88.9 percent—say yes. What constitutes sufficient incentives? For most, "sufficient" means several incentives, and for most, it starts with pay increases. Indeed, almost four-fifths of those replying seek higher pay if they're to move; more than two-fifths, profit-sharing; and two-fifths, cash bonuses. Almost one in three looks forward to a stock-purchase plan.

Inexplicably, expectations are considerably higher for making a move now than they were a year ago. To illustrate, about three times as many respondents in CD's most recent survey state that they'd want profit-sharing and stock options as in the survey of 12 months before. And about twice as many would be motivated by improved retirement benefits and increased medical-dental benefits.

(With regard to salary increase needed to make a move, the typical, or median, expectation is 21 percent. Even so, nearly one-fourth of the respondents would demand a 26 percent or higher boost from a new employer.)

In addition to incentives that put money in the pocket or add to personal assets, there are other inducements valued by managers willing to move. Company cars or car allowances appeal to almost 35 percent, while improved retirement plans get the votes of almost 30 percent. Relocation benefits are important to 25 percent, as you might expect of persons who will move for substantial incentives.

At a prestigious California univer-

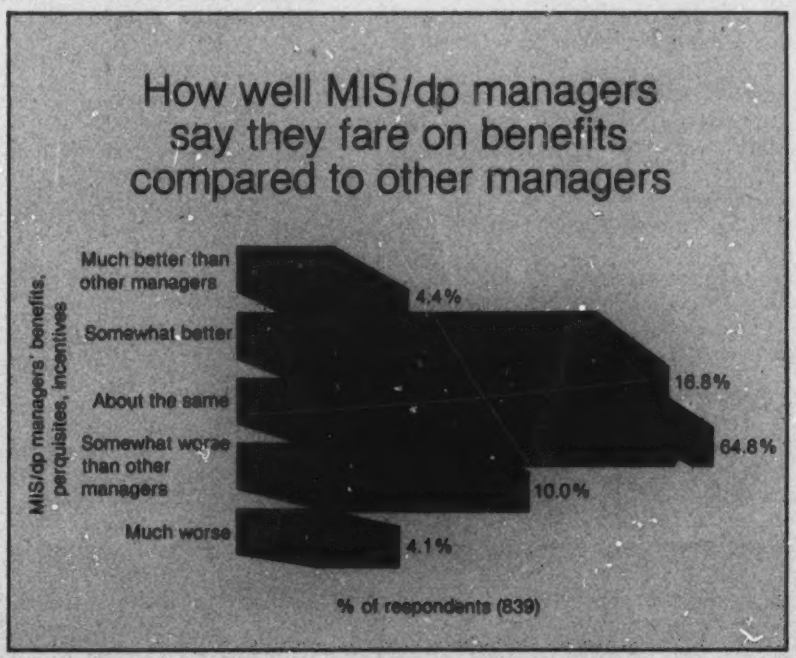
Who got questionnaires?

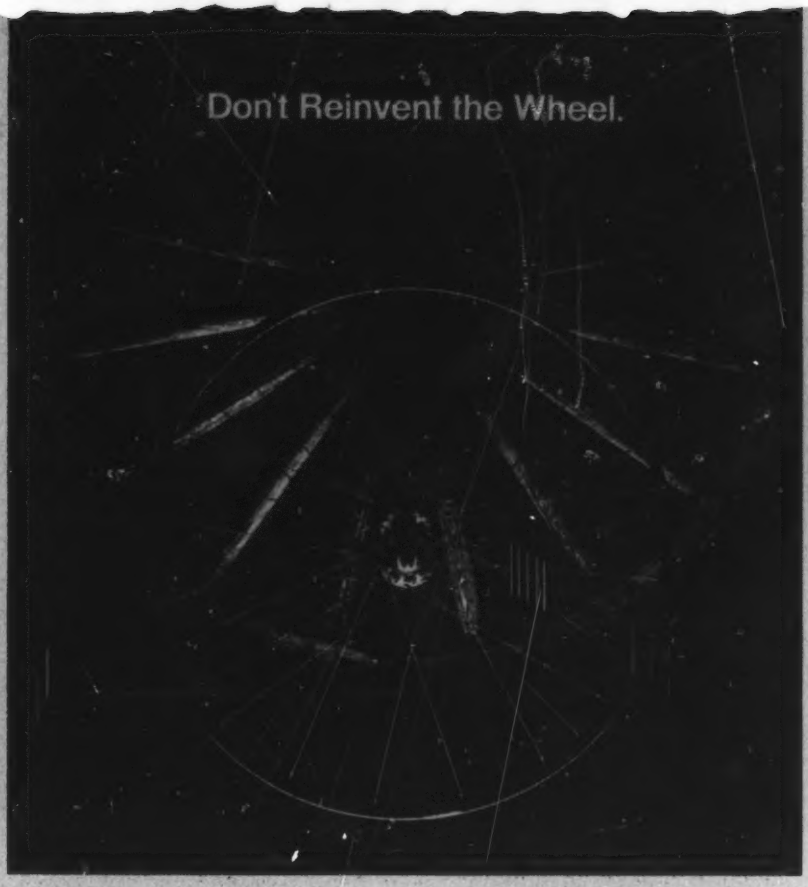
Altogether, 4,850 salary-status questionnaires showed up on the desks of MIS/dp managers on the *Computer Decisions* circulation list last fall. They had been selected randomly by computer from among *Computer Decisions'* subscribers who are MIS/dp managers. If you held a manager's title or one that was essentially the same, the chances were roughly one in 10 that you'd have received a questionnaire.

Response to the recent *Computer Decisions* survey was excellent: No fewer than 877 readers filled out four-page questionnaires of 39 questions each, for a response rate of 18 percent, substantially better than last year's healthy 12 percent return. That degree of interest on the part of readers makes the results statistically valid and projectable.

(By contrast, another computer magazine's 1981 salary survey was based on 300 returned questionnaires out of an unreported number of questionnaires mailed. And the salary figures were scattered over 47 job categories. The *Computer Decisions* survey covers only managers in MIS/dp.)

Please note that, as might be expected, not all respondents answered all questions. So for any given question, somewhat fewer than 877 may have provided information; the actual number answering is indicated in each bar chart.





This year you plan to upgrade hardware, but what about your application systems? Will you redevelop or convert? Redeveloping from scratch is expensive, time-consuming and risky. Your existing systems incorporate your unique business experience and history. They are debugged. And they are paid for. Why not extend their lives and preserve your investment?

Rand has been helping clients do just that since 1968. We have converted over 20 million lines of code at a fixed price, on schedule, with 100% accuracy guaranteed by warranty. Rand specializes in large-scale conversions involving data base, data communications and on-line systems.

Don't start another development project without first considering the benefits of converting with an expert in the field.

RAND INFORMATION SYSTEMS, INC.

98 Battery Street
San Francisco, CA 94111
(415) 392-2500

CIRCLE 155

Salary-Status

(Continued from page 91)

sity, a young communications manager would move, he says, for "nontaxable stuff," among other items. He cites access to company-provided "vacation retreats" as an example.

But there's more to moving on to another organization than direct, pecuniary inducements. Greater challenges are sought by 63.3 percent. For example, a Virginia manager would move for "more responsibility and newer technology." Similarly, a man in charge of all dp operations for a manufacturer in the southeast would like to "perform functions that are more enjoyable to me."

What are some of the other unsatisfied yearnings that might induce MIS/dp managers to leave one employer for another? One that crops up occasionally is for more authority and control over operations. "More say in how corporate dp can support goals of the bank" is the plaint of a manager with three IBM mainframes and more than 40 subordinates. A dp manager in government service near New York longs for "hire-fire authority." A young man who's second in command in a $2 million budget organization would like to work with "more cooperative management."

A few managers answering the survey volunteer comments about more desirable locations. Greener pastures for a male Marylander with a midrange income would simply be an "opportunity to live in a different part of the country." To a man managing two IBM System/34s for a manufacturer, it's "leave the L.A. area." A man in

(Continued on page 194)

Salary-Status Survey

(Continued from page 92)

his forties, from New Jersey, could be tempted to move to "a place to retire in and take care of the family." [Watch for the article on early (working) retirement in the May 1982 issue of *Computer Decisions*.]

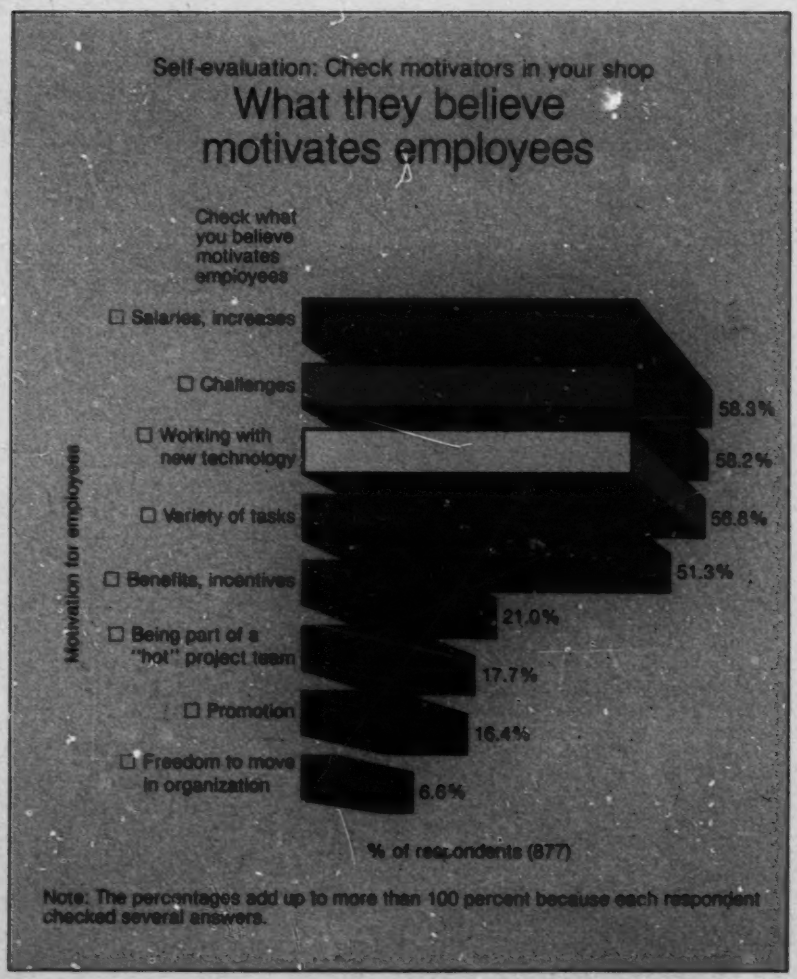
In the last analysis, the number of positions actually held by MIS/dp managers tells a lot about their willingness to switch allegiance. Findings from the recent survey contain the record: One in three has worked for only one organization in the past 10 years, while almost one in three has had two employers. On the other hand, just a little more than one-third of the respondents (35.8 percent) have received paychecks from three or more organizations in the past decade. If this group can be considered job-hoppers, then about two-thirds of the respondents are staying put.

For a considerable number of respondents, moving *on* is a way to a move *up*—into general management. So say 39 percent. (You'll remember that altogether 49.4 percent are interested in leaving MIS/dp for general management, up about 10 percentage points from the previous year.) Many see MIS/dp as too limited for the exercise of managerial talent or too little respected by corporate executives.

"Recognition from employer" and "status in organization equal to finance personnel, etc." are reasons for pushing upward into general management from a young MIS director in education. Another MIS man in a mountain state complains that he's "at the top of MIS"—there's no place else to go. For a Massachusetts dp manager, it's simply "challenge and salaries."

As a matter of fact, 14.4 percent of those giving a reason for wanting to move from dp management into general management say it's because they want more decision-making ability.

If you're planning to move up from MIS/dp management, you ought to give thought to who will succeed you, to make it a smooth transition. For that reason you'll want to read "Scenario for succession," which appeared in the January issue of *Computer Decisions* under the byline of Herbert Halbrecht, president of Halbrecht Associates (Stamford, CT), an executive-search organization. Based on a survey of executives, the article reveals, for example, that only 58 percent of MIS/dp executives have formal succession plans. (Tearsheets are available.)



Motivating employees

If managers are motivated by various benefits, perks, and other incentives, they ascribe some of the same motivations to their own employees in MIS/dp. Not surprisingly, about three in five feel that salaries and increases are most important to their subordinates. But close behind are challenges (58.2 percent), working with new technology (56.8 percent), and variety of tasks (51.3 percent). Note well, however, that these latter items have nothing to do with monetary rewards. Benefits and incentives are relatively low-ranked (21.0 percent), and so are promotions (16.4 percent). Even being part of a "hot" project team and the freedom to move to other jobs in the

World's Biggest Exposition of DEC-Compatibles!

DEXPO™ 82

The First National DEC-Compatible Industry Exposition

Marriott Hotel, Atlanta
May 10-12, 1982

The Only Show Big Enough for All Your DEC-Directed Needs

At DEXPO 82 every exhibitor will be demonstrating products and services that are compatible with your DEC system. Now, there's no reason to visit any other show.

DECUS Conference Registrants: Your Atlanta schedule is not complete until you visit DEXPO 82 — only a few blocks from your meetings!

- Compare thousands of the newest DEC-compatibles — more than you've ever seen before — all under one roof.
- Select alternatives, enhancements and special solutions from an *international* group of vendors.
- Attend free "Product Forums" demonstrating the latest capabilities, applications and ideas.
- Meet more than 100 vendors of DEC-compatible software, hardware and related services and supplies.

DEC is a registered trademark of the Digital Equipment Corporation. DEXPO 82 is not affiliated with DECUS or the Digital Equipment Corporation.

Mail Today for Reduced Rate Tickets & Hotel Discounts

☐ Send _____ reduced-rate tickets for my associates and myself. Also send information on discount hotel rates.

NAME _____

TITLE _____

COMPANY _____

ADDRESS _____

CITY _____

STATE _____ ZIP _____

Mail to:
Expoconsul International, Inc.
19 Yeger Road
Cranbury, N.J. 08512
(Phone: 609-799-1861)

CIRCLE 110

Salary-Status Survey

(Continued from page 194)

organization elicit only lukewarm response from managers as motivating factors with employees (17.7 and 6.6 percent respectively). (Nearly half the managers participating in The *Computer Decisions* Salary-Status Survey supervise one to nine employees, and one-fourth of the managers, 10 to 19. The typical, or median, number of subordinates is 11.)

A manager in the east, who finds satisfaction in "training people," reports that "giving them responsibility and authority" is one of three factors that best motivates his subordinates. A Floridian, with a good deal of justification, votes for location as a motivator. "Upper management support" is the contribution of a second-in-command manager with an insurance carrier.

Putting the evidence to work

Finally, let's say you really have it in mind to enhance the rewards of your labor by moving on or moving up and obtaining better benefits, perquisites, and pay. You'll do well to scout the ground, and one way to do that is to check out what your counterparts are getting. By looking over the results of this magazine's survey, you can get a good glimpse of how others are benefiting. Better yet, check off the boxes that run with the bar graphs in this article, for a comparison of how your benefits and perks stack up. And don't forget to consult last month's survey article on salaries and other monetary rewards. You're sure to find these more trustworthy guides to career planning than office scuttlebutt or cocktail-party gossip. You might even use the survey figures to worm more out of your present employer if you decide to stay. □

Note: One small error crept into Part I of The Computer Decisions *Salary-Status Survey, published in the last issue. The median, or typical, increase that a respondent would need, in addition to other incentives, to move on to another organization is actually 21 percent. The figure printed previously was 20 percent.*

Interest-free loan: Must you pay tax?

The Internal Revenue Service has tried hard to collect income tax on loans extended to employees when the employees pay back principal amounts only. The IRS contends that an employee receives income equal to the interest that ordinarily would have been charged. Thus, in the Service's collective judgment, such a favored employee should pay federal tax on that "income," reports the J.K. Lasser Tax Institute.

But that's not the way the rules should be interpreted, according to the U.S. Tax Court and three circuit courts. So, in short, you needn't declare the interest dollars you save by accepting an interest-free loan.

Here's an abbreviated list of further benefits you won't be taxed for, according to *J.K. Lasser's Your Income Tax*, (Simon and Schuster):

- Recruiting-agency fee paid by employer.
- Meals provided at cost in company dining rooms.
- Physical examinations paid for by an employer.
- Insurance premiums for group hospitalization, Medicare Part B coverage, group term-life protection, and group legal services paid by the organization for you (with a few exceptions).
- Transportation in a company commuter van seating eight or more adults, provided the service is available to all employees.
- Educational assistance benefits that are nondiscriminatory.
- Turkeys, hams, or similar edibles given by the employer at holiday times (though cash bonuses, gift certificates in most cases, and other gifts that can be turned into cash easily must be declared).

COMPUTER
DECISIONS
MAY 1982
THE MANAGEMENT MAGAZINE OF COMPUTING
A HAYDEN PUBLICATION

5/13/82
C4485-1

Early (working) retirement: Is it for you?

Electronic conferencing

Personal computers: At your service

Mixed blessing?

C1013DESK-CO---0C1D024045
DESK COPY A
CONGRESSIONAL 1 SERV
SRI ACQUISITIONS MM3058I
4520 EW HWY STE 800
WASHINGTON DC 20014

COMPUTER DECISIONS

THE MANAGEMENT MAGAZINE OF COMPUTING

MAY 1982

Volume 14 Number 5

Copies Printed: 127,520

FEATURES

70 Group decisions: Can computers help? / David J. Kull *What happens when you arm a board meeting with sophisticated data-analysis and graphic-display equipment?*

86 Portables: At your service / Julia G. Brown *Portable terminals and computers are getting smaller and easier to use, and new competition has forced some established vendors to slash prices.*

108 Early (working) retirement: Is it for you? / Auren Uris *Youthful, vigorous middle age and double-digit inflation have helped create an alternative to traditional retirement at age 65.*

124 Keeping up professionally / David Whieldon *Staying abreast of technology and management techniques is imperative.*

138 Doors open for multilingual staff / William F. Zachmann *There's evidence that dp professionals are eager to learn and use the newer languages.*

70

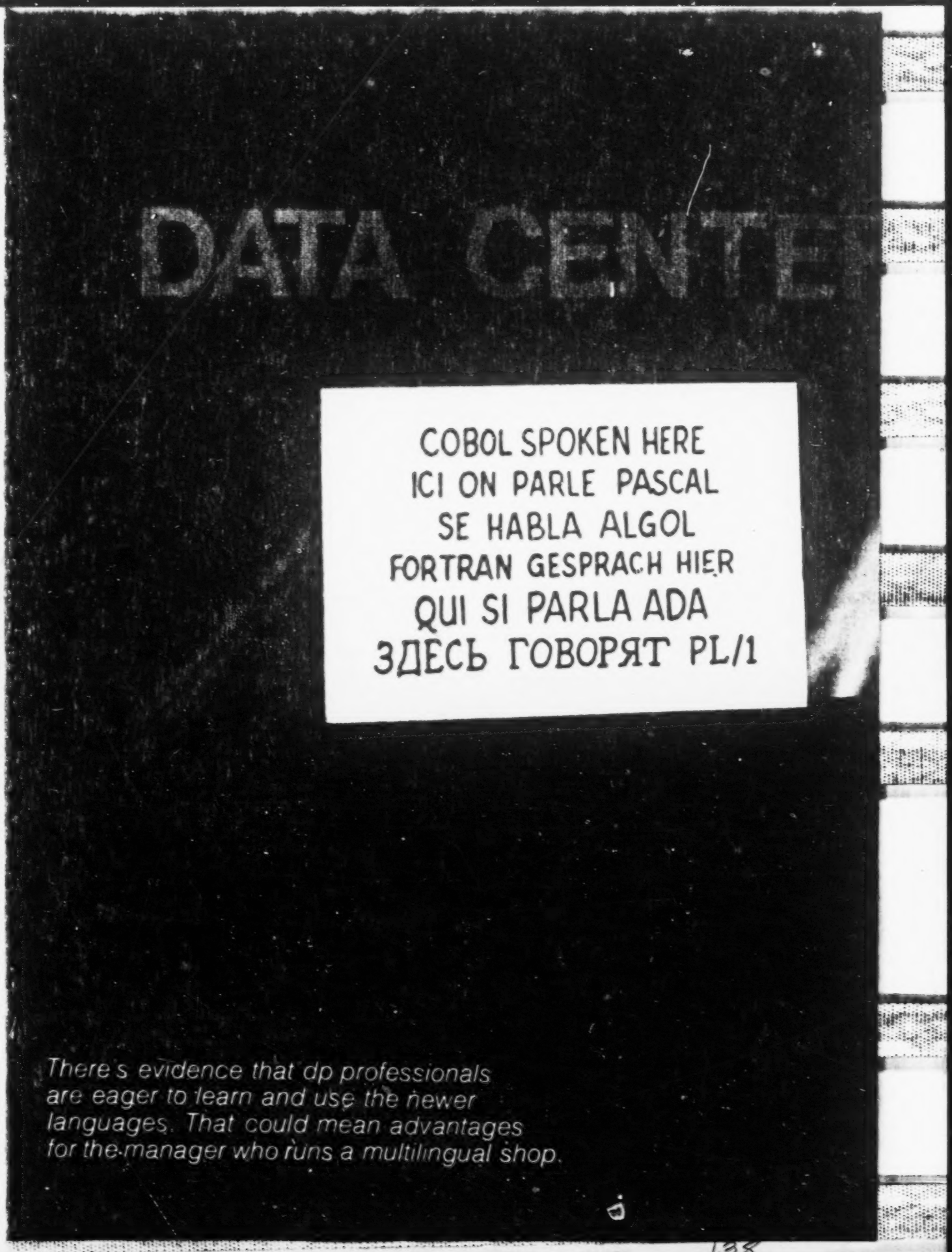
86

108

COLUMNS / DEPARTMENTS

6 INSIGHT
Will you get your monthly checks?
10 NEWS & COMMENT
30 SNYDERS ON SOFTWARE
Data dictionaries
48 DATA COMMUNICATIONS
AT&T policy shift
54 FOLLOWING THE LEADERS
IBM dropping 360 compatibility?
59 APPLYING MICROSYSTEMS
Using micros effectively
60 OFFICE AUTOMATION
Electronic Mail
64 COPING WITH VENDOR PLOYS
162 YOUR CAREER
164 LETTERS
171 SOFTWARE
172 SERVICES
174 SECURITY
176 PERIPHERALS
177 ACCESSORIES
178 SYSTEMS
179 OFFICE EQUIPMENT
182 DATA-COMM EQUIPMENT
183 SUPERMARKET
184 ADVERTISER INDEX

COVER PHOTO: Edward Hardin



There's evidence that dp professionals are eager to learn and use the newer languages. That could mean advantages for the manager who runs a multilingual shop.

Doors open for multilingual staff

(Continued from page 139)

reach has an unparalleled opportunity to make a true leap forward in satisfying his users (finally!), in providing better service to his organization, and in utilizing his scarcest resource—software development people—more effectively. After all these years of being the whipping boy, today he has the opportunity to be a hero." Hardly an opportunity we would want to pass by!

Of course, the critical element driving the recent interest in new and higher-level languages is the clear crisis in application software development productivity. The continuing drop in the cost of computing power and the explosive growth in personal computers and small business systems, far from helping to solve the productivity problem, only aggravates it. Growth in hardware is running far ahead of the software needed to use the information handling capacity effectively.

But "every stick," as the saying goes, "has two ends." And while there is lots of talk about the productivity to be gained from newer languages and higher-level DBMSs, the information system director in a typical organization knows very well how much he or she has invested in traditional languages. Millions of hours of training and experience have been built up and possibly billions of lines of code have been written in computer installations large and small. No information systems executive this side of sanity will want to leap unthinkingly into the newer languages. The cost—in training, in potential compatibility problems, in maintaining older systems, in recruitment, and in the possibility of picking the "wrong" new language—is much too high. As in any business decision, there must be a clear return on the investment required in a newer language for its adoption to be worthwhile.

This explains the high level of interest in measuring productivity in application system development. Users want to be able to measure the productivity of different languages and methods so they can make objective decisions about which ones to use. Unfortunately, no one has come up with a good all-round measure of productivity. While lines of code per programmer month and similar measures have some utility, they are entirely inadequate to assess the new languages and techniques.

Author William F. Zachmann is director of research for International Data Corp., a consulting, educational, publishing, and market research organization in Framingham, MA.

Still, we *are* seeing accelerating adoption of newer languages in user organizations. Users are becoming convinced, even in the absence of strict quantitative measures of productivity, that the newer languages do offer benefits. And the mix of programming languages five and 10 years from now is likely to be very different from the present mix (see "Use of programming languages" chart).

We have strong evidence that such changes will occur in the results of a survey of 10,000 programmers, analysts, and managers conducted last September by International Data Corporation. A whopping 84.5 percent of the more than 1,000 respondents agreed that which programming language a programmer uses can make a big difference in how much he or she can get done in a day. An even greater majority of managers (86.9 percent) than programmers (83.6 percent) agreed with that survey proposition.

Asked about the traditional programming languages, the programmers, analysts, and managers surveyed did not think that they were the best for the job. Barely one respondent in 20 thought that Cobol was as effective as a newer DBMS for developing systems; 94.2 percent said it's not. Asked if Cobol and Fortran were just as good as other languages for writing good programs quickly, only 15.5 percent definitely agreed that Cobol was, and an even smaller number (4.3 percent) definitely agreed that Fortran was.

Most significant of all, however, were responses to a question on newer languages. Overall, 35.4 percent of all respondents agreed with the statement: "If I had my choice, I'd use one of the newer languages like Pascal for programming."

Lest it be thought that this is simply the wild-eyed opinion of a batch of newcomers, it should be pointed out that the survey tapped a particularly experienced group of people. Of all the respondents, 58.8 percent were managers, 24.6 percent analysts, and 14.0 percent programmers, with just 2.6 percent in other categories. Overall, those sampled had an average of over 10 years' full-time professional experience in information processing.

Detailed analysis of the question about newer languages like Pascal tells quite a bit about the situation faced by the information systems director today. There are significant differences, in the views of programmers and analysts, on the one hand, and managers, on the other. While a majority of programmers (50.4 percent) and nearly a majority of analysts (48.2 percent) said they would prefer to use a newer language like Pascal, a much smaller percentage

(Continued from page 140)

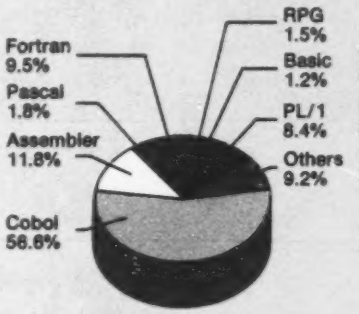
of managers (26.6 percent) expressed that preference. Even among information systems managers and directors there is strong support for newer languages—with over one in four favoring them—but that is not nearly as strong as the one in two programmers and analysts preferring languages like Pascal.

This is especially significant because on most questions in the survey there were not very big differences between the views of managers and those of programmers and analysts. It undoubtedly reflects the managers' greater concern with compatibility, maintenance of older software, and the other potential problems mentioned earlier. (However, even the 26.6 percent of managers favoring newer languages like Pascal is clearly a far greater proportion than the 1.8 percent of new programming actually being done in Pascal.)

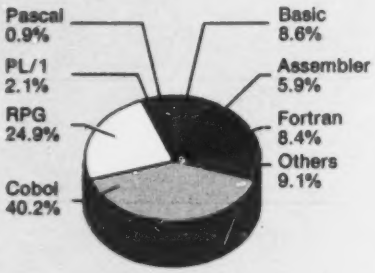
Nevertheless, the consensus seems to be that there are significant productivity gains available from newer languages and methods and that the adoption of these will be a growing factor in the management of information systems development organizations over the next few years. So if you've been wondering whether your staff will have to learn a new language, the answer is probably "yes."

Use of languages

Large sites (Staff greater than or equal to 20)



Small sites (Staff less than 20)



Source: International Data Corp.

Cobol still dominates, according to a survey conducted last fall by International Data Corporation. Although traditional languages are still used for the majority of new development, they are already starting to lose share to newer languages. The survey of over 1,000 large and small installations shows (see chart) that while Cobol continues to be the most widely used language in both larger and smaller installations, it has already begun to slip from its former dominance. And Fortran, once much more widely used, is now just barely ahead of PL/1 in larger organizations and running fourth behind Cobol, RPG and Basic in smaller organizations.

What is most remarkable about these findings, however, is the growing role of new languages. In both large and small organizations, a varied list of newer languages accounts for just over 9 percent of all new programming done. And in large organizations, nearly 2 percent of all new code is being written in Pascal. While this is a very small percentage, it is highly significant; only a few years ago there was no evidence of *any* significant use of Pascal in large organizations. The 1.8 percent use quite clearly represents significant growth in the use of Pascal that can be expected to continue.

Also of particular interest is the strong showing of PL/1. With 8.4 percent of all new programming in large organizations, PL/1 is used nearly as much as Fortran. This also reflects a continued growth in the use of PL/1 at the expense of Cobol and Fortran. There seems to be little doubt that Cobol, Fortran, and RPG are past their peaks in new programming. We will certainly see a continued decline in share for these languages over the next few years.

Cobol remains strong

None of which is to imply that languages like Cobol and Fortran are about to disappear. They will not. Cobol, in particular, can be expected to remain significant at the end of the decade. This would be true even if we were to stop writing new programs in Cobol tomorrow. The huge existing base of software written in Cobol would still be used and need to be maintained for many years.

And we are not about to stop writing new programs in Cobol. The investment in training in the older languages will ensure that they continue to be used for some time.

Any change brings with it hazards and uncertainties. But it also creates opportunities. While it is certainly possible for an organization to insist that programming continue to be done in the traditional languages, and thus to avoid the risks of change, it is probably not going to be the most effective strategy for the longer run. There are several reasons for this.

First, the productivity gains available from newer languages and techniques are too sorely needed to be passed by. We agree strongly with ex-

The IBM 3232 Model 51 is available at over 100 IBM-authorized distributor locations across the country. Contact any of the distributors listed below.

American Computer Group, Inc.
617-437-1100

Arrow Electronics, Inc.
Call your local
Arrow office

Carterfone Communications Corp.
214-630-9700

David Jamison Carlyle Corp.
800-526-2823
800-421-3112

Hall-Mark Electronics Corp.
800-527-3272
214-343-5079 Texas

Hamilton Avnet Electronics
Call your local Hamilton Avnet stocking location. Or call Hamilton Avnet Microsystems 213-615-3950

Kierulff Electronics, Inc.
Call your local
Kierulff division

Pacific Mountain States Corp.
800-423-2853
800-272-3222 California

Schweber Electronics Corp.
800-645-3040
516-334-7474 New York

Wyle Distribution Group
213-322-8100
408-727-2500

Or call IBM at 800-431-1833
(in New York call
800-942-1872)
for more information.

IBM®

Languages

(Continued from page 142)

perts like Martin and McCracken that there are major gains available to users from the newer methods. This takes two forms: new languages and higher-level software. Each is important for slightly different reasons.

Higher-level software, such as that represented by the newer DBMSs, report generators, graphics and statistical packages, and report writers, provides an extremely important alternative to traditional programming for many uses. Using the right software packages, it is possible to eliminate much traditional programming with very large gains in productivity.

Even for those applications for which the new higher-level, general-purpose software will not provide sufficient flexibility or efficiency, newer programming languages are still important. This is primarily because the traditional languages do not really lend themselves very well to fully structured programming techniques. Designed before the principles of program structure were discovered, languages like Cobol, Fortran, Basic, and RPG do not naturally lend themselves to good structured technique nearly as well as newer languages. Pascal and Ada, for example, were designed with structured programming concepts built in from the start.

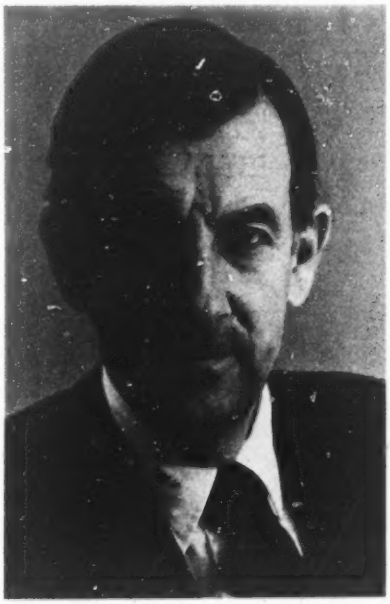
There are still more advantages to the newer languages. Among these are more concise syntax, data typing, better and more flexible control structures, improved subroutine and function definition and invocation facilities, and improved debug and diagnostic capabilities. While features like these are not as important in simpler programs, such as those likely to be replaced by higher-level software, they are very important for the more complex programming that will continue to be the domain of programming languages.

Multilingual psychology

A second major reason for the adoption of newer languages lies in human psychology. Linguist Benjamin Lee Whorf hypothesized that the language an individual speaks acts to shape, in very fundamental ways, the way that individual perceives the world. Recent

study of the learning and use of programming languages strongly suggests that there are critical parallels between the psychology of programming languages and that of natural languages, and that something like the Whorfian Hypothesis applies to programming languages as well.

The matter is put more pointedly, though from a different perspective, by a well-known psychologist, the late Abraham Maslow, who said, "If the only tool you have is a hammer, you tend to treat everything as if it were a nail." Programmers whose sole programming language is Cobol (or Fortran or RPG) have a very strong tendency to see programming problems "in Cobol." Their approach to program design and conception of what is possible—or hard or easy—to do is

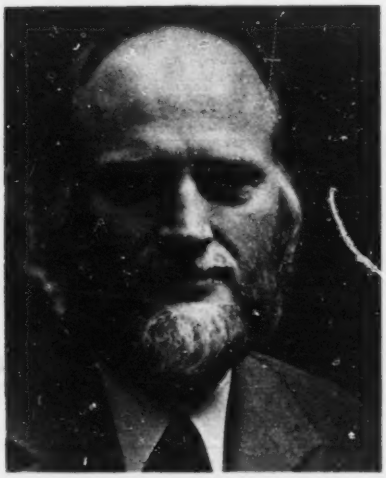


"The higher-level languages are the most important development in computing right now." *James Martin*

(Continued on page 148)

Languages

(Continued from page 145)



"After all these years of being whipping boys, dp managers have the opportunity to be heroes to users."
Dan McCracken

shaped by their knowledge of a particular language.

It is widely recognized that attaining fluency in a foreign language has the effect of broadening an individual's perception of the world by giving him or her the ability to "see" the world through another language and from another cultural perspective. Something very similar seems to happen when programmers learn other programming languages, according to our survey results. Their conception of programming is broadened. They begin to see their function in terms of the fundamental structures of programming, rather than only through the horizons of possibility opened up by a single language.

In other words, a "multilingual" programmer is likely to be a better programmer, as well. His or her ability to view the program development task through more than one language provides a perspective that makes it easier to understand common elements and to grasp the generality of the problem. Teaching a programmer a second language, therefore, has benefits that go beyond simply acquiring the ability to use that language. Additional gains will

be found in increased programming skill and improved ability to think through alternative solutions to programming problems—all of which will further enhance productivity.

A third and final reason why acceptance of newer languages for application development will be a good idea for most organizations is employee motivation. Tools and techniques can be a big help to productivity, but they are not much good without highly motivated people to apply them.

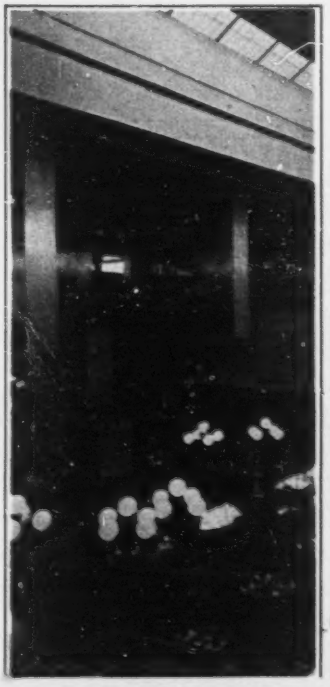
Our survey results showed that even though the majority of programmers want to use newer languages only one in 25 is doing so. It is as if half the architects in the world preferred to use drafting machines, but were required to use T-squares and triangles instead. It does not take very subtle reasoning to see that organizations using newer languages will have an advantage in recruiting, retaining, and motivating high-quality programmers and analysts. And that is an advantage that will tend to increase over the next few years.

The most widely used programming languages are over 20 years old. Despite the huge investment in them, they simply do not provide the advantages of the newer languages that make use of the advances in software design over the past two decades. Software professionals who responded to our survey voice a very strong desire to use the newer languages because they feel they can be more productive with them.

All this adds up to a very high probability that your staff will need to learn new languages. To ensure that you obtain the productivity gains these languages can provide, it will be a good idea to actively encourage this development. The payoffs in productivity, in motivation, and in increased programmer competence are just too great to be ignored. □

RAL104C

"Albuquerque?
I don't know how to spell it,
but I know where
to stay when
I get there."



If you've seen Albuquerque recently, you'll know that it's changed.
And in the heart of its revitalised downtown district lies one of the sources of its new life.
A hotel which manages to look and breathe modernity, and yet has not forgotten the lessons of the past.
For the traveler in search of perfection, a surprise lies in wait.

the Regent ALBUQUERQUE
A REGENT® INTERNATIONAL HOTEL

HONG KONG BANGKOK KUALA LUMPUR MANILA COLOMBO FIJI SYDNEY ALBUQUERQUE NEW YORK CHICAGO PUERTO RICO MAUI MONTREAL
ALBUQUERQUE 505-247-3344, TELEX 660450; U.S.A. TOLL FREE 800-545-4000 OR YOUR TRAVEL AGENT.

CIRCLE 79

COMPUTER
DECISIONS
THE MANAGEMENT MAGAZINE OF COMPUTING

JUNE 1982

6/10/82
1 C4485-1

C8013CCDY-8----001D024045
CODY B
CONGRESSIONAL I SERV UCV
SRI ACQUISITIONS MM30581
4520 EW HWY STE 800
WASHINGTON DC 20014

MAKE WAY FOR MICROS

Crt. teleprinter wall chart

No more 9 to 5?

Gartner's Top 100

BEST AVAILABLE COPY

COMPUTER decisions

THE MANAGEMENT MAGAZINE OF COMPUTING

JUNE 1982

Volume 14 Number 6

Copies Printed: 131,500

Features

122 **Local networks: Making the right connection** / John Seaman *If you're having trouble moving data and other messages around town, a local-area network may be the solution.*

160 **No more 9 to 5?** / David Kull *Alternative work schedules are boosting data-processing productivity and cutting turnover. The new arrangements place special responsibilities on managers.*

184 **Make way for micros** / David Whieldon *Desk-tops are popping up all over, often without the knowledge or approval of MIS/dp managers. Find out how they're bought, applied, and controlled.*

204 **Win with Winchesters** / Leonard Bleininger *If you're sticking with removable-pack devices for high-speed disk storage, you're losing out in terms of costs, reliability, and floor space.*

210 **Generators do the trick** / Jan Snyders *Like magic, program generators, application generators, and report writers perform the most amazing feat of all: They save time and money.*

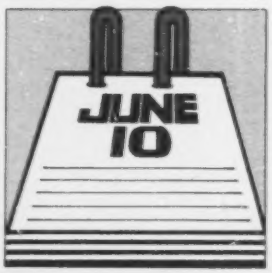
230 **Third annual crt and teleprinter comparison charts** / *This pull-out will help you to compare the features of the many available products.*

Applications

180 Marathon debugging
182 Fresh information
202 On-site microfiche reports
246 Computer keeps on trucking
252 Modeling stabilizes company
254 System brings order
261 Graphics helps company

77

108

160


210

Columns / Departments

11 INSIGHT
14 NEWS & COMMENT
54 SNYDERS ON SOFTWARE
Inventory control
77 FOLLOWING THE LEADERS
Gartner's Top 100
100 DATA COMMUNICATIONS
Two-computer terminal
104 APPLYING MICROSYSTEMS
The new/old Apple III
108 COPING WITH VENDOR PLOYS
Leading users to legal limbo
116 OFFICE AUTOMATION
Historical lessons
120 CURRENT PRACTICES
Converting programs
240 YOUR CAREER
Sexual harassment
248 LETTERS
262 NEW PRODUCTS
284 ADVERTISER INDEX
285 SUPERMARKET

COVER PHOTO: Norman Snyder

by Lawrence M. Honig

FOLLOWING THE LEADERS

1981's Top 100 dp vendors

Last year was a very good one for the suppliers of data-processing equipment, software, and services.

Following an exceptional 1980 with another year of substantially stronger performance than the American economy as a whole—while recessionary or near-depression conditions prevailed in such major industries as auto manufacturing and housing—the Top 100 U.S. corporations (see Chart 2 on next two pages) recorded dp revenues totaling $65.9 billion. That represents a 19.38 percent increase over the $55.2 billion garnered by the same companies in 1980.

Highlights of the year

• Adjusting 1981 results to account for an estimated 9.2 percent inflation, the federal gross national product (GNP) deflator statistic, the industry in toto had revenues of $59.9 billion. This represents a real increase of 8.53 percent. Compare this

(Continued on page 80)

This is the third year the Gartner Group has prepared its list of the Top 100 data-processing vendors. The editors of Computer Decisions *welcome this important compilation and analysis, which will be published in this magazine on an annual basis.*

Chart 1

Top 20 in revenue growth rate *(Dollars in millions)*

		Total dp revenue growth 1981/1980	U.S. dp revenue growth 1981/1980	Foreign dp revenue growth 1981/1980	Total dp revenues 1981	1981 Top 100 rank
1	Warner Communications Inc.	475.0%	455.6%	650.0%	$ 115.0	71
2	Tandon Corp.	142.6	130.0	213.6	70.4	91
3	Apple Computer Inc.	142.6	126.6	197.6	400.7	23
4	Tandy Corp. (Radio Shack)	109.1	110.8	102.2	460.0	20
5	Lanier Business Products	95.0	97.3	64.7	249.6	36
6	Tandem Computers Inc.	88.3	88.3	88.3	242.5	38
7	Paradyne Corp.	78.4	93.7	42.7	135.4	59
8	Commodore International Ltd.	78.3	87.6	75.3	176.0	49
9	NBI	77.7	69.9	157.1	76.7	86
10	Cray Research Inc.	67.3	107.5	-36.4	101.6	74
11	Systems Industries	65.8	98.1	11.6	62.9	94
12	Dysan Corp.	65.7	61.4	88.4	104.2	72
13	Zenith Data Systems	65.2	66.1	63.1	71.0	89
14	Intergraph Corp.	61.3	59.0	66.3	91.1	78
15	CPT Corp.	61.3	64.3	n/m	123.8	65
16	Data Resources Inc.	59.5	n/c	n/c	59.0	97
17	General Electric Co.	54.7	50.8	63.3	735.0	14
18	American Express Corp.	52.8	52.8	n/c	81.0	84
19	Gould (SEL)	48.6	47.5	51.5	129.1	64
20	Wang Laboratories	47.9	92.0	-33.7	1,008.5	9

Notes
n/c: not calculable
n/m: not meaningful

THE TOP 100

Chart 2

The Top 100

U.S.-based companies, ranked by 1981 dp revenues. (Dollars in millions)

		1981 dp revenues	1980 ranking	1980 dp revenues	1979 ranking	1979 dp revenues
1	IBM Corp.	$25,111.0	1	$21,367.0	1	$18,338.0
2	Digital Equipment Corp.	3,586.6	3	2,743.3	6	2,031.5
3	Control Data Corp.	3,131.3	2	2,765.6	5	2,248.0
4	Burroughs Corp.	2,934.0	6	2,478.0	3	2,442.0
5	NCR Corp.	2,838.0	4	2,714.0	2	2,528.0
6	Sperry Univac	2,781.0	5	2,552.0	4	2,270.0
7	Hewlett-Packard Corp.	1,875.0	8	1,583.0	8	1,147.0
8	Honeywell Information Systems	1,774.0	7	1,634.1	7	1,452.6
9	Wang Laboratories	1,008.5	11	681.8	15	410.4
10	Storage Technology Corp.	890.9	14	603.5	13	479.5
11	Xerox Corp.	872.0	9	770.0	11	570.0
12	TRW Corp.	855.0	12	750.0	10	655.0
13	Data General Corp.	764.3	13	672.8	12	539.6
14	General Electric Co.	735.0	18	475.0	18	392.0
15	Memorex Corp.[1]	711.0	10	686.0	9	658.0
16	Texas Instruments Inc.	640.0	15	562.0	17	398.0
17	Computer Sciences Corp.	624.7	16	560.3	14	415.4
18	Automatic Data Processing	613.0	17	507.0	16	405.0
19	Electronic Data Systems Corp.	480.6	19	408.5	20	311.5
20	Tandy Corp.	460.0	35	220.0	41	150.0
21	Datapoint Corp.	453.0	21	364.0	24	272.2
22	Amdahl Corp.	442.8	20	394.4	19	320.0
23	Apple Computer Inc.	400.7	45	165.2	70	60.1
24	Prime Computer Corp.	364.8	27	267.6	38	152.9
25	Management Assistance Inc.	349.1	23	310.4	23	275.4
26	McDonnell Douglas Corp.	346.5	25	280.0	26	244.9
27	Triumph-Adler Inc.	320.0	22	325.0	21	295.0
28	Mohawk Data Sciences Corp.[2]	314.0	26	277.7	27	232.3
29	Harris Corp.	313.0	28	260.0	29	210.0
30	Tektronix Inc.	308.9	24	286.4	30	206.9
31	Teletype Corp.[3]	293.2	29	250.0	43	145.0
32	Computervision Corp.	270.7	41	191.1	50	103.0
33	Dataproducts Corp.	270.0	31	248.3	34	172.7
34	Raytheon Data Systems	260.0	34	225.0	33	175.0
35	ITT Corp.	250.0	30	250.0	25	245.0
36	Lanier Business Products	249.6	52	128.0	60	78.0
37	Tymshare Inc.	246.8	38	211.0	32	176.2
38	Tandem Computers Inc.	242.5	51	129.8	64	66.4
39	Racal Electronics Ltd.[4]	240.0	37	212.0	39	151.9
40	Four-Phase Systems Inc.	233.7	40	197.2	31	178.7
41	Perkin-Elmer Corp.	226.6	33	226.0	35	172.5
42	Northern Telecom Inc.	222.0	36	217.1	22	293.3
43	3M Corp.	220.0	39	205.0	36	160.0
44	C. Itoh Electronics	213.0	42	189.0	37	154.0
45	Boeing Computer Services	205.5	47	140.3	56	96.0
46	National Semiconductor Corp.	203.4	32	245.0	28	230.0
47	Motorola Inc. (Codex)	180.0	48	140.0	44	135.0
48	Sanders Associates	180.0	46	145.0	77	47.0
49	Commodore International Ltd.	176.0	63	98.7	68	64.1
50	M/A COM, Inc.	171.0	n/m	n/a	n/m	n/a

Notes
n/a: not available
n/m: not meaningful

[1]Now part of Burroughs; revenues from January to end of November only.
[2]Includes Qantel.
[3]A subsidiary of Western Electric, owned by AT&T.
[4]U.S. operations only.
[5]A subsidiary of Chase Manhattan Corp.
[6]First Data Resources.
[7]A subsidiary of McGraw-Hill.

		1981 dp revenues	1980 ranking	1980 dp revenues	1979 ranking	1979 dp revenues
51	Allied Corp.	160.0	n/m	n/a	n/m	n/a
52	Nixdorf Computer Corp.[4]	159.3	49	137.8	53	100.1
53	Informatics Inc.	150.3	56	125.9	48	112.4
54	Schlumberger Ltd.	148.0	n/m	n/a	80	45.2
55	Ampex Corp.	147.0	44	169.7	40	151.2
56	Wyly Corp.	146.8	59	117.8	58	87.1
57	Telex Corp.	142.7	57	117.9	54	99.4
58	United Telecommunications Inc.	137.4	53	127.7	52	101.0
59	Paradyne Corp.	135.4	74	75.9	83	41.4
60	General Instrument Corp.	135.0	43	172.0	42	149.4
61	Shared Medical Systems Corp.	131.6	62	105.6	59	82.3
62	Recognition Equipment	131.5	60	113.1	55	98.2
63	Bradford National Corp.	130.6	61	110.1	46	120.1
64	Gould (SEL)	129.1	67	86.9	62	71.0
65	CPT Corp.	123.8	73	76.7	78	45.6
66	Sun Information Services	121.8	66	86.9	65	66.2
67	Planning Research Corp.	117.2	54	127.4	51	102.3
68	Centronics Data Computer Corp.	115.9	50	128.9	45	126.6
69	General Automation Inc.	115.6	55	126.7	47	118.4
70	Reynolds & Reynolds	115.4	58	117.8	49	109.5
71	Warner Communications Inc.	115.0	97	20.0	n/m	n/a
72	Dysan Corp.	104.2	79	62.9	89	33.8
73	Gerber Scientific Inc.	101.9	72	78.0	71	55.0
74	Cray Research Inc.	101.6	80	60.7	82	42.7
75	Dun & Bradstreet	100.0	64	96.7	57	91.3
76	Martin Marietta Data Systems	99.2	71	78.1	72	54.7
77	Commerce Clearing House, Inc.	92.0	77	67.4	75	49.3
78	Intergraph Corp.	91.1	83	56.5	92	29.5
79	Quotron Systems Inc.	88.1	78	62.9	86	39.7
80	Modular Computer Systems	87.2	70	81.1	61	71.0
81	Lear Siegler Inc.	85.0	75	75.0	66	65.0
82	Comshare Inc.	82.4	65	88.2	63	66.9
83	Interactive Data Corp.[5]	81.1	76	69.0	73	53.0
84	American Express Corp.[6]	81.0	88	53.0	74	50.0
85	Triad Systems Corp.	79.1	81	60.2	88	37.4
86	NBI	76.7	91	43.2	95	22.1
87	National Data Corp.	71.9	87	53.0	84	40.9
88	Computer Automation Inc.	71.8	69	81.4	67	64.4
89	Zenith Data Systems	71.0	92	43.0	94	25.0
90	Management Science America	70.6	85	53.2	87	38.8
91	Tandon Corp.	70.4	96	29.0	n/m	n/a
92	Verbatim Corp.	68.6	90	48.4	81	45.0
93	American Management Systems	65.6	82	58.5	76	48.1
94	Systems Industries	62.9	94	37.9	93	25.0
95	Printronix Inc.	60.2	89	48.9	90	32.8
96	Exxon Office Systems	60.0	68	86.0	69	62.0
97	Data Resources Inc.[7]	59.0	95	37.0	n/m	n/a
98	Nashua Corp.	58.0	84	53.5	85	40.1
99	Floating Point Systems	57.9	93	42.4	91	29.6
100	MSI Data Corp.	56.9	86	53.2	79	45.4
	Summary:	$69,917.7		$55,215.2		$46,041.8

THE TOP 100

(Continued from page 77)

to the real GNP increase of 2 percent: In real terms, the dp industry did four times better than the economy as a whole. (All figures following are nominal, or unadjusted for inflation.)

- It took dp revenues of $56.9 million to make the Top 100 list in 1981, up from $49.7 million in 1980.
- IBM captured only 38.1 percent of the 1981 dp revenues, down from 38.75 percent in 1980. Without IBM, the top 99 companies still grew more slowly than in 1980—at 20.8 percent, compared with 23.5 percent. However, IBM trailed the growth-rate leaders (see Chart 1) by less in 1981; IBM's dp growth rate of 17.5 percent would place it 54th out of 100.
- Of the 80 corporations for which this statistic can be measured, only 30 reported increased operating margin in 1981 (see Chart 5).
- Eleven companies experienced absolute declines in revenues gained from dp; the largest percentage revenue gains came in microcomputers and their peripherals, word processing, and special systems.
- Once again, IBM's incremental dp revenues exceeded any other U.S. corporation's entire dp revenues.

Who they are

The composition of the Top 100 changed in 1981. Ten companies that made the 1980 list are out this year; two disappeared by acquisition: Systems Development Corp. (No. 43 last year), sold to Burroughs, and Bunker Ramo (47), sold to the Allied Corp. Eight more failed to make the list because their revenues fell short: Anacomp (No. 96 last year), General Datacomm (86), Conrac (94), Rolm (89), Auto-Trol Technology (95), the American arm of ICL (99), and bankrupt AM International (65), which is getting out of dp.

On the other side of the coin, 10 new faces appeared; two, again, by acquisitions: Allied (now No. 51) and Schlumberger (54); seven due to revenue growth; and one due to redefinition of dp revenues. The seven newcomers include Warner Communications (71), whose Atari division put it atop the list in revenue growth (see Chart 1) this year and whose leap of 55 places on the Top 100 list also outran the rest of the field. Others new to the Top 100 this year are word processor NBI (No. 86); micro maker and retailer Zenith (89), owner of the Heath chain; micro-DASD wizards Tandon (91); Systems Industries (94); value-added timesharing operation Data Resources (97), a McGraw-Hill subsidiary; and Floating Point Systems (99).

> In 1981, for every dollar spent on a large system, another 10.2 cents—up from 5.6 in 1980—was spent on micros.

We already know that there will be more changes among the Top 100 for 1982: Memorex (No. 15) is now part of Burroughs; Four-Phase Systems (40) is now part of Motorola; Ampex (55) is now one of the Signal Companies; 45 percent of Centronics (68), assuming that a pending agreement is ratified, will be owned collectively by Control Data, NCR, and ICL.

Trends by industry sector

While mainframe revenues, defined as revenues from systems costing more than $250,000, still account for the largest identifiable portion of the dp industry, this portion has continued to shrink (see Chart 3). Mainframe revenues increased only 10.31 percent in 1981, making this the slowest growth sector. By comparison, the glamorous micro and word-processing fields both more than doubled in revenue. An examination reveals that in 1980, for each dollar spent on a large system, another 5.6 cents was spent for microcomputers; in 1981 this has crept up to 10.2 cents.

Another rapidly growing segment is software and services. Software considered alone accounted for $3.5

Chart 3

Growth by market segment of the Top 100

(Dollars in millions)	1981 revenues in sector	1980 revenues in sector	Change 1981/1980
Mainframes (over $250 K purchase)	$16,477	$14,937	10.31%
Minicomputers ($15 to 250 K)	9,991	8,188	22.01
Microcomputers (under $15 K)	1,697	848	100.19
Word processing systems	2,010	922	117.97
Top 100 total systems revenues:	$30,175	$24,895	21.21%
OEM peripherals and terminals	$4,321	$3,847	12.31%
End-user peripherals and terminals	7,846	6,830	14.87
Data-communications equipment	1,455	1,056	37.77
Software	3,521	2,210	59.32
Maintenance—hardware and software	9,964	9,015	10.52
Services	7,265	6,224	16.73
Other dp revenues	1,370	1,146	19.50
Top 100 total dp revenues:	$65,917	$55,223	19.37

billion in 1981, up more than 59 percent from $2.2 billion in 1980. The importance of this segment goes far beyond revenues, of course; little (although rapidly growing) Visicorp, with estimated 1981 calendar revenues of only $20 million, has clearly had a major role in accelerating the growth of microcomputing. Furthermore, software is a larger component in smaller systems. While the bulk of the dollar increase in this segment undoubtedly arises from unbundling by manufacturers—and hence can be considered captive, to a certain extent, to the existing hardware—microcomputer purchasers will often configure a system around desired software. However, no supplier of only microcomputer software was prosperous enough to make the Top 100 in 1981. If first-time micro buyers spend an additional 50 percent of their hardware cost on software in the first year—as an industry maxim predicts—this situation is likely to change.

In word processing, IBM, by virtue of the Displaywriter, leaped to the top of Chart 13, creating in one year a business unit larger than any wp competitor. We estimate that the Displaywriter and various unbundled program products account for only 2 percent of IBM's dp revenues, but this still works out to more than $500 million.

> It took dp revenues of $56.9 million to make the Top 100 list this year, up from $49.7 million in 1980.

Five of 1981's top 20 in one-year revenue growth make and sell microcomputers (see Chart 1). While Warner led the pack with a gain of 475 percent, to an estimated $115 million in dp sales, each of the other micro builders recorded gains of 65 percent or more. Besides Warner, Apple, Tandy, Commodore, and Zenith, Tandon, No. 2 on the growth-rate list with a gain fractionally better than Apple's, can also be regarded as a micro industry factor, since OEM sales to micro manufacturers account for all of Tandon's revenues. Lanier, NBI, CPT, and Wang represent the wp vendors on this list, with Wang, at the bottom, boasting a "mere" 48 percent gain. Systems Industries is the only builder of plug-compatible peripherals on this list (Storage Technology just failed to make it, with growth of only 47.6 percent), but three value-added timesharing entities did make the

Chart 4

The bottom 20

Ranked by 1981/1980 dp revenue growth rate. (Dollars in millions)

		Total dp revenue growth	U.S. dp revenue growth	Foreign revenue growth	Total dp revenue 1981	1981 Top 100 rank
1	Exxon Office Systems	-30.2%	-27.7%	-100.0%	$ 60.0	96
2	General Instrument Corp.	-21.5	-23.1	-18.3	135.0	60
3	National Semiconductor Corp.	-17.0	-23.4	-9.1	203.4	46
4	Ampex Corp.	-13.4	-.1	-32.4	147.0	55
5	Computer Automation Inc.	-11.8	-10.2	-15.6	71.8	88
6	Centronics Data Computer Corp.	-10.1	n/m	n/m	115.9	68
7	General Automation Inc.	-8.8	-12.8	-.7	115.6	69
8	Planning Research Corp.	-8.0	-4.8	-98.5	117.2	67
9	Comshare Inc.	-6.6	n/m	n/m	82.4	82
10	Reynolds & Reynolds	-2.0	-3.2	12.0	115.4	70
11	Triumph-Adler Inc.	-1.5	-2.9	.0	320.0	27
12	ITT Corp.	.0	.0	.0	250.0	35
13	Perkin-Elmer Corp.	.3	5.9	-9.3	226.6	41
14	Northern Telecom Inc.	2.3	1.8	2.5	222.0	42
15	Dun & Bradstreet	3.4	n/m	n/c	100.0	75
16	Memorex Corp.	3.6	.0	7.4	711.0	15
17	NCR Corp.	4.6	10.6	-.5	2,838.0	5
18	MSI Data Corp.	7.0	-.9	26.9	56.9	100
19	3M Corp.	7.3	10.3	.0	220.0	43
20	Modular Computer Systems	7.5	2.0	32.8	87.2	80

Notes
n/m: not meaningful
n/c: not calculable

Chart 5

The top 10 performers ranked by dp operating margin

The average is 21.3 percent, which is nearly double the 11.2 percent average operating margin for the 80 corporations in the Top 100 for which such margins are available. These 80 represent 94 percent of the Top 100's total dp revenues. (Dollars in millions)

		Dp operating profits as percent of 1981 dp revenues	Dp operating profits, 1981	Dp margin rank, 1980	Dp operating profits as percent of 1980 dp revenues	Change in dp margin 1981/1980
1	Cray Research Inc.	30.0%	$ 30.4	2	30.5%	-1.9%
2	Shared Medical Systems Corp.	25.0	32.9	4	23.7	5.4
3	IBM Corp.	23.5	5,908.0	3	24.5	-3.9
4	Commodore International Ltd.	22.4	39.5	1	32.1	-30.0
5	Computervision Corp.	20.5	55.4	5	21.3	-4.1
6	Tandem Computers Inc.	19.2	46.5	10	17.7	8.3
7	Apple Computer Inc.	18.7	74.8	6	20.2	-7.5
8	Storage Technology Corp.	18.3	162.7	15	16.8	8.5
9	NBI	18.0	13.8	12	17.1	5.3
10	Hewlett-Packard Corp.	17.2	323.0	8	18.4	-6.3

Chart 6

Ranking by 1981 dp operating profits *(Dollars in millions)*

		1981 operating profits	1980 operating profits	Change 1981/1980
1	IBM Corp.	$5,908.0	$5,231.0	12.9%
2	Digital Equipment Corp.	596.2	433.6	37.5
3	Hewlett-Packard Corp.	323.0	291.0	11.0
4	NCR Corp.	292.0	389.9	-25.1
5	Control Data Corp.	285.4	237.0	20.4
6	Burroughs Corp.	269.0	145.0	85.5
7	Sperry Univac	178.0	254.5	-30.1
8	Storage Technology Corp.	162.7	101.6	60.1
9	Honeywell Information Systems	158.0	185.8	-15.0
10	Wang Laboratories	112.3	115.1	-2.4

grade: General Electric, whose General Electric Information Systems Co. (Geisco) arm alone topped $500 million in 1981; American Express, owner of First Data Resources, the financial clearing system; and McGraw-Hill's Lexington, MÁ-based Data Resources unit. Media maker Dysan scored high, as did mini manufacturer SEL, now owned by Gould, and Tandem Computers. Rounding out the top 20 in growth are Cray Research, data-comm specialist Paradyne, and the CAD system maker Intergraph.

IBM dominates the harvest of profits from dp more thoroughly than it dominates sales (see Chart 6). Fully 60 percent of the total dp operating profits accrue to Big Blue, a figure essentially unchanged from 1980. IBM also ranks very near the top in terms of dp profitability, defined as dp operating profits divided by dp revenues, with a rating of 23.5 percent (see Chart 5). That the average dp vendor fares less well than the top 10 in operating margin is apparent from the fact that the Top 100 mean margin (unweighted by revenues) is only 11.1 percent—a far cry from the industry total margin of 15.72 percent. The top 10 in margin include, in addition to IBM, six of the top 20 in revenue growth, indicating that the market in microcomputers and word processors has yet to feel

the pinch of serious cost competition; in a demand-pull market, manufacturers have far greater latitude to manage their short-term profitability.

An analysis of revenues per dp employee (see Chart 7) reveals that distributor C. Itoh leads the field by a wide margin, with an astonishing $355,000 per dp employee. IBM ranks 19th, but its performance is far more impressive when actual dp operating *profit* per employee is considered: IBM ranks fourth in this category, trailing Cray, Apple, and Shared Medical Systems.

IBM accounted for almost half of the American dp industry's overseas revenues (see Chart 8). This represents a modest decline in share from last year, when a bit more than half went to IBM. The top 10 companies in foreign dp revenue accounted for more than 80 percent of the Top 100's total overseas revenues of $25.2 billion. The total figure, depressed as sales abroad were depressed by the strong dollar, still represents a healthy $2.7 billion (12 percent) boost over 1980. Both Digital Equipment Corp. (DEC) and Data General grew at more than 20 percent abroad last year. In total, the Top 100 gained 38 percent of their revenues from overseas sources in 1981, down from 41 percent in 1980.

> Once again, IBM's incremental dp revenues exceeded any other U.S. corporation's entire dp revenues.

American vendors continued to dominate the worldwide dp business (see Chart 9). Eight of the world's 10 largest computer manufacturers are based in the United States. However, English ICL ranks fifth in two-year growth among these 10 firms, and Tokyo-based Fujitsu ranks seventh.

Measured by absolute dollars spent on research and development, the top 10 companies on Chart 10 parallel the top 10 in dp revenue. This is not surprising. It is enlightening to observe, however, that six of the 10 spend less of each dollar of revenue on R&D than the industry mean of 8.2 percent. *(Continued on page 88)*

Chart 7

Ranking by 1981 revenue per dp employee

Eighty-two of the Top 100 companies—representing $61,874.7 million, or 93.86 percent, of total Top 100 dp revenues—have 952,600 dp employees. For these 82 companies the average dp revenue per dp employee was $73,100 in 1981.

		Dp revenue (dollars in thousands) per dp employee	Total dp employment 1981	Dp operating profit per dp worker (dollars in thousands)	Profit/ worker rank, 1981	Dp revenues 1981 (dollars in millions)
1	C. Itoh Electronics	$355.0	600	n/a	n/a	$ 213.0
2	Lear Siegler Inc.	170.0	500	n/a	n/a	85.0
3	General Automation Inc.	152.1	800	9.5	19	115.6
4	Apple Computer Inc.	148.4	2,700	27.7	2	400.7
5	Systems Industries	139.6	400	10.0	16	62.9
6	Commerce Clearing House Inc.	124.7	700	7.1	35	92.0
7	Zenith Data Systems	119.4	600	13.4	9	71.0
8	National Semiconductor Corp.	98.6	2,100	-3.6	67	203.4
9	Data Resources Inc.	98.3	600	n/a	n/a	59.0
10	CPT Corp.	97.2	1,300	16.3	5	123.8
11	Cray Research Inc.	94.2	1,100	28.2	1	101.6
12	Nixdorf Computer Corp.	90.4	1,800	n/a	n/a	159.3
13	NBI	90.2	900	16.2	6	76.7
14	Shared Medical Systems Corp.	87.7	1,500	22.0	3	131.6
15	Amdahl Corp.	86.8	5,100	5.5	44	442.8
16	Lanier Business Products	86.1	2,900	11.0	12	249.6
17	Wyly Corp.	84.2	1,700	4.4	49	146.8
18	Sun Information Services	82.4	1,500	8.5	24	121.8
19	IBM Corp.	81.9	306,700	19.3	4	25,111.0
20	Reynolds & Reynolds	81.9	1,400	-1.8	66	115.4

Notes
n/a: not available

THE TOP 100

(Continued from page 86)

Only Amdahl makes both the top dollars spent on R&D and the top R&D percentage (see Chart 11) lists. Computer-aided-design vendors and other software-intensive ventures recognize the importance of high R&D spending; four of these top 10 fall into those market segments. IBM spends 5.5 percent of its revenues on dp R&D, generous enough for a rank of 42 (out of 62 companies available for analysis).

To compile the Top 100 and related charts, we defined dp revenues as monies coming in from sale, lease, rental, or service of general purpose dp products and services during the calendar year ending December 31, 1981. Included are all systems hardware normally classed as mainframes, minicomputers, microcom-

Chart 8

Ranking by 1981 foreign dp revenues

The top 10 of the 95 Top 100 companies for which foreign-revenue data are available took in a total of $20,515.5 million in foreign dp revenues in 1981, compared to $18,677.2 million in 1980, for a growth rate of 9.9 percent. The growth rate for all 95 companies (representing 98.92 percent of the total Top 100 dp revenue) averaged 11.9 percent, based on total 1981 foreign dp revenues of $25,200 million, compared to 1980 foreign revenues of $22,527.1 million. (Dollars in millions)

		Foreign dp revenues 1981	Foreign dp as percent of total 1981 dp revenues	Foreign dp revenues 1980	Foreign dp growth rate 1981/1980	Top 100 rank 1981
1	IBM Corp.	$12,029.0	47.9%	$11,207.0	7.3%	1
2	Digital Equipment Corp.	1,470.5	41.0	1,097.7	34.0	2
3	NCR Corp.	1,465.0	51.6	1,472.3	-.5	5
4	Burroughs Corp.	1,284.0	43.8	1,090.0	17.8	4
5	Sperry Univac	1,183.6	42.6	1,087.0	8.9	6
6	Control Data Corp.	974.9	31.1	901.3	8.2	3
7	Hewlett-Packard Corp.	905.0	48.3	786.0	15.1	7
8	Honeywell Information Systems	591.0	33.3	501.1	17.9	8
9	Memorex Corp.	350.0	49.2	326.0	7.4	15
10	Data General Corp.	262.4	34.3	208.8	25.7	13

Chart 9

The top 10 companies, worldwide, in dp revenues *(Dollars in millions)*

		1981 dp revenues	1980 dp revenues	1979 dp revenues	Two-year compound growth rate
1	IBM Corp.	$25,111	$21,367	$18,338	17.0%
2	Digital Equipment Corp.	3,587	2,743	2,032	32.9
3	Control Data Corp.	3,131	2,766	2,248	18.0
4	Burroughs Corp.	2,934	2,478	2,442	9.6
5	NCR Corp.	2,838	2,714	2,528	6.0
6	Sperry Univac	2,781	2,552	2,270	10.7
7	Hewlett-Packard Corp.	1,875	1,583	1,147	27.9
8	Fujitsu Ltd.*	1,811	1,621	1,484	10.5
9	Honeywell Information Systems	1,774	1,634	1,452	10.5
10	ICL*	1,487	1,584	1,195	11.6

Notes
*Revenues in U.S. dollar equivalents

puters, word processors, peripherals, terminals, data-communications hardware, disk or tape media, maintenance, and software packages or systems. We did not include revenue from communications services, typewriters, electronic cash registers, instrumentation, semiconductors or board-level components, assembled printed-circuit boards, automatic test equipment, telecommunications equipment such as PABXs, or dp supplies such as forms or paper. Companies whose primary business is distribution or leasing of equipment made by others were excluded.

These data are gathered and refined by the Gartner Group each year, and certain restatements have been made here to information published in previous years. These restatements may have altered previously published rankings.

(Continued on page 92)

Chart 10

Ranking by research and development expenditures

The 62 Top 100 companies for which R&D-expenditures data were available account for 85.6 percent of Top 100 total dp revenue. These 62 companies spent a total of $3,073.2 million on R&D in 1981, $2,670.8 million in 1980. Their 1981 R&D expenditures represented an average of 8.9 percent of their 1981 dp sales—see chart 11. (Dollars in millions)

		Dp R&D expenditures 1981	Dp R&D expenditures 1980	Dp R&D as percent of dp sales 1981	Dp R&D as percent of dp sales rank, 1981
1	IBM Corp.	$1,386.3	$1,277.0	5.5%	42
2	Digital Equipment Corp.	292.0	217.1	8.1	23
3	Sperry Univac	251.6	215.6	9.0	17
4	NCR Corp.	229.2	201.0	8.1	24
5	Control Data Corp.	201.9	182.0	6.4	37
6	Honeywell Information Systems	192.0	150.0	10.8	8
7	Burroughs Corp.	189.2	175.0	6.4	36
8	Hewlett-Packard Corp.	180.0	139.0	9.6	15
9	Wang Laboratories	75.8	51.6	7.5	29
10	Amdahl Corp.	75.1	62.5	17.0	2

Chart 11

Ranking by R&D as a percentage of sales

The average for these top 10 is 14.5 percent, which is considerably higher than the average of 8.9 percent for all 62 Top 100 companies for which this percentage could be calculated. The 62 represent 85.6 percent of the Top 100's total dp revenues. (Dollars in millions)

		Dp R&D expenditures 1981	Dp R&D expenditures 1980	Dp R&D as percent of dp sales, 1981
1	Management Science America	$ 16.4	$ 12.8	23.2%
2	Amdahl Corp.	75.1	62.5	17.0
3	Cray Research Inc.	16.3	8.8	16.0
4	Floating Point Systems	8.8	4.6	15.3
5	Dysan Corp.	15.9	10.9	15.2
6	Schlumberger Ltd.	20.0	n/a	13.5
7	Intergraph Corp.	12.0	6.2	13.1
8	Honeywell Information Systems	192.0	150.0	10.8
9	Tektronix Inc.	32.0	n/a	10.4
10	Computervision Corp.	27.3	18.9	10.1

Notes
n/a: not available

THE TOP 100

(Continued from page 90)

The Gartner Group is responsible for all calendarizing of fiscal revenues. In addition, data from conglomerated enterprises are often closely held; in some instances, the data presented here represent our best estimate of applicable revenues. Due to these factors, it is possible that we have overlooked certain vendors entirely.

Who, back in 1966, would have picked tiny DEC to become the arbiter of minicomputer architecture?

We invite any company that believes it should be included in the 1982 survey to contact the Gartner Group.

What does it all mean?

The wealth of financial statistics gathered for a survey such as the annual Top 100 are meaningful for more than analysis of a particular company's stock price. Indeed, one must be wary of attaching too much importance to any given ranking or growth rate, as a look back to the 1966 rankings (see Chart 12) will reveal. Who could have foreseen the hazards of buying a large system from that year's No. 3 vendor, General Electric? Who, at the dawn of the multiprocessing era, would have picked tiny DEC to become the de facto arbiter of minicomputer architecture?

The situation today is similarly confusing: Rival mainframers NCR and Burroughs deal with the same supplier of workstations; rumors of nonstop architecture (to compete with the pioneer, Tandem) abound at many companies; and an untrackable plethora of microcomputer software, nominally compatible through "standard" operating systems, is sprouting at the grass-roots level, in the offices of users.

Certain conclusions are inescapable; IBM will continue to enjoy a stature unique among manufacturers in a competitive industry, and other mainframe manufacturers will face an increasingly hostile situation—squeezed from the top by "commodity pricing," made possible by unprecedented automation at IBM, and from the bottom by increasingly powerful micro and office systems from specialty manufacturers.

The growth rate of the micro sector will attract competition. The relatively high profit margins enjoyed by vendors specializing in this segment will inevitably come under attack as more companies enter the market and predatory pricing for market share increases. Additional problems for micro builders will occur as plug-in hardware modules, which emulate various operating systems, become

The high profit margins enjoyed by micro vendors will come under attack as predatory pricing for market share increases.

(Continued on page 98)

Chart 12

Two decades of change

Is the past prologue? Compare the 1981 rankings and revenues of a dozen major companies with their rankings and revenues in 1966, at the dawn of the multiprocessing-machine era, and with their projected revenues in the era's 20th year, 1985. (Dollars in millions)

Top 100 rank 1981		Relative dp rank 1966	Dp revenue 1966	Compound growth rate 1966-1981	Dp revenue 1981	Expected 5-year growth rate	Projected 1985 dp revenue
1	IBM Corp.	1	$3,229	13.61%	$25,111	15%	$43,919
2	Digital Equipment Corp.	9	23	39.96	3,587	28	9,628
3	Control Data Corp.	5	168	21.09	3,131	14	5,289
4	Burroughs Corp.	8	90	25.89	2,934	13	4,784
5	NCR	7	130	22.44	2,838	13	4,627
6	Sperry Univac	2	430	11.99	2,781	11	4,222
7	Hewlett-Packard Corp.	n/m	Not in dp	n/m	1,875	26	4,726
8	Honeywell Information Systems	4	192	15.10	1,774	12	2,791
9	Wang Laboratories	10	3	48.39	1,008	25	2,461
10	Storage Technology Inc.	n/m	Not in dp	n/m	891	25	2,175
14	General Electric*	3	249	4.56	735	20	1,524
n/m	RCA	6	140	n/m	out of dp		

Notes
n/m: not meaningful
*General Electric makes a poor showing in compound growth rate because it temporarily dropped out of dp, only to return strongly in its seond coming.

(Continued from page 92)

widely available. They will permit any popular micro to emulate any other designated micro and, naturally, support the software written for the latter. This competition is likely to benefit the user, who should continue to enjoy more power at lower cost for the foreseeable future. Whether the user and the MIS department will see eye-to-eye over this "benefit" is problematical; sales trends to date indicate that information will become increasingly valuable as a resource. MIS directors who plan for this will find their influence enhanced if they can successfully integrate the new machines (and users) into the evolving framework. (See "Make way for micros" in this issue.)

What of the projected "mips bulge" of the late '80s? By "mips bulge" we mean the proliferation of cheap, powerful chips, such as the Intel 432 and its progeny, and systems built around them. IBM's client base presents a tempting target for would-be vendors of such devices, and it behooves users and vendors alike to examine IBM's possible reactions. Most likely, Big Blue will attempt to consume this burgeoning processor power. It will do so by embellishing operating software with user-friendly but computation-intensive overlays such as new menu-driven, self-documenting applications writers; more elaborate encryption and security for data sharing; and, eventually, high-level database languages incorporating synonym tables and lexical decoders for truly natural language interaction. (These, in turn, represent a base for consuming even more power in the next decade with such features as voice input in real time or detailed pattern-recognition for industrial applications.) Naturally, each additional layer of software is a barrier to plug-compatibility and a defense against user out-migration.

This could be the last year AT&T's name is missing from the Top 100; next year, it may leap into the top 10.

This could be the last year that AT&T, in its own name, is missing from the Top 100. (Ma Bell is, of course, represented through its indirect ownership of No. 31, Teletype Corp.) Although it can be argued that Western Electric has made computers for years, calling them switches and selling them to the captive operating companies of the Bell System, these revenues are almost impossible to break out from the general flow of funds within the Bell System. If the most recent consent decree stands as originally authored in January, this lack of recognition will change dramatically. In an unregulated world, it is not unreasonable to expect AT&T to leap into the top 10.

The Gartner Group will publish a detailed compilation of these data in a book which should become available in early summer. This volume will contain more than 100 cross-section charts and extensive analysis of the structure of the dp industry by company, product, and financial concept. For more information, contact Lawrence M. Honig, director—industry measurement, at the Gartner Group, 72 Cummings Point Rd., Stamford, CT 06902, (203) 964-0096. For a brochure on this reference work, circle No. 505 on the Reader-Service Card at the back of this issue. □

Chart 13

Ranking by 1981 word-processing revenues

(Dollars in millions)

		Wp revenues 1981	Wp percent change 1981/1980	Dp revenues 1981	Wp as percent of total dp 1981	Top 100 rank 1981
1	IBM Corp.	$502.2	n/m	$25,111.0	2.0	1
2	Wang Laboratories	453.8	79.9	1,008.5	45.0	9
3	Lanier Business Products	190.0	72.6	249.6	76.1	36
4	Xerox Corp.	148.2	113.9	872.0	17.0	11
5	Digital Equipment Corp.	143.5	74.3	3,586.6	4.0	2
6	Hewlett-Packard Corp.	112.5	n/m	1,875.0	6.0	7
7	CPT Corp.	107.7	63.2	123.8	87.0	65
8	Raytheon Data Systems	70.2	4.0	260.0	27.0	34
9	NBI	69.0	72.0	76.7	90.0	86
10	Burroughs Corp.	58.7	18.4	2,934.0	2.0	4

Notes
n/m: not meaningful

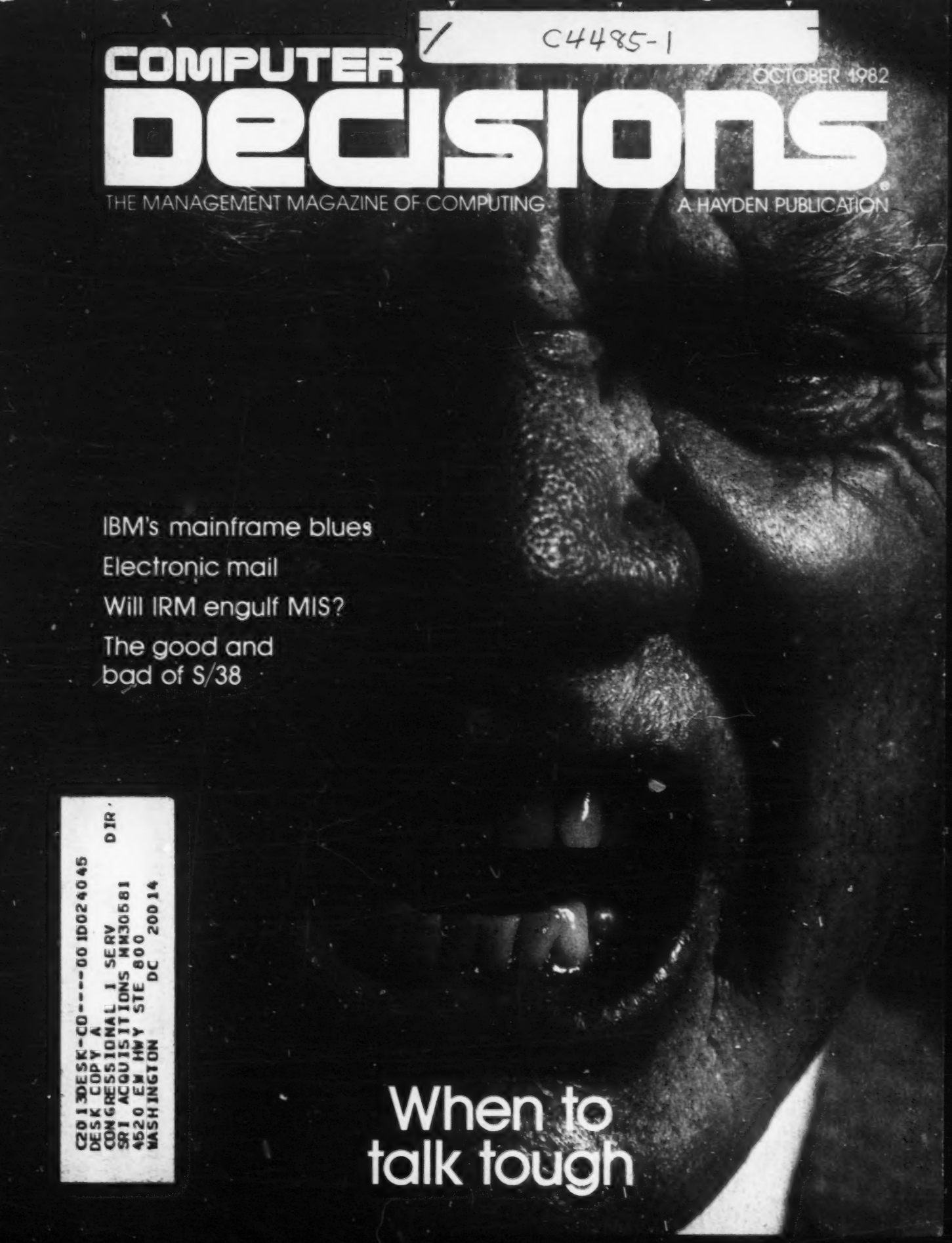
C4485-1

COMPUTER DECISIONS

OCTOBER 1982

THE MANAGEMENT MAGAZINE OF COMPUTING

A HAYDEN PUBLICATION



IBM's mainframe blues

Electronic mail

Will IRM engulf MIS?

The good and bad of S/38

When to talk tough

C2013DESK-CO----00ID024045
DESK COPY A DIR
CONGRESSIONAL I SERV
SRI ACQUISITIONS HM30581
4520 EW HWY STE 800
WASHINGTON DC 20014

COMPUTER DECISIONS®
THE MANAGEMENT MAGAZINE OF COMPUTING
OCTOBER 1982
Volume 14 Number 10
Copies Printed: 129,830

Features

88 The good and bad of System 38/ Robert T. Fertig *In spite of its faltering beginning, System/38 is gaining momentum. No surprise, because it's one of IBM's "strategic" products.*

94 The dawn of IRM/ David Kull *An emerging way of considering information—as an asset—promises important changes for MIS/dp.*

110 Pulling the power in/ David Whieldon *Consider doing for yourself what service companies now do for you. You may be able to cut costs considerably.*

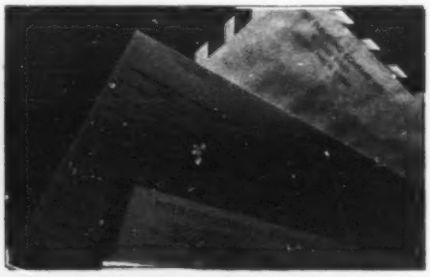
128 Electronic mail: Coming at you/ John Seaman *Fed up with the limitations of the telephone and postal services for interoffice communications? Electronic mail can help.*

162 Testing your mettle/ Martin Lasden *In these lean times, the case for aggressive efforts to measure the performance of dp and telecommunications systems is greater than ever.*

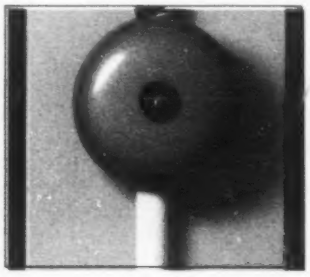
176 When to talk tough/ Martin Lasden *In the age of prima donna techies and consensus management, warring words may produce unpalatable results.*

110

128



162



Columns / Departments

10 INSIGHT
Put computer crime in perspective
14 NEWS & COMMENT
39 SNYDERS ON SOFTWARE
A window on your system
60 DATA COMMUNICATIONS
Shared database for micros
66 APPLYING MICROSYSTEMS
Data-management ills cured at NBC
70 FOLLOWING THE LEADERS
Will competition give IBM the blues?
74 OFFICE AUTOMATION
Organizing an OA support staff
84 COPING WITH VENDOR PLOYS
192 YOUR CAREER
Dealing with "difficult" pros
194 NEW PRODUCTS
198 SUPERMARKET
200 ADVERTISER INDEX

COVER PHOTO: Ted Hardin

by Gideon I. Gartner

FOLLOWING THE LEADERS

Will competition give IBM the blues?

Although the market for mainframes is growing more slowly than those for minicomputers and microcomputers, it will remain the major market for computers for many years to come. That's why maintaining share of this market is so important to those competing for it. As you can see by the chart, "Market for mainframes," IBM not only maintains its dominance in mainframes, but should expand its share of market by 1984.

Sperry Univac's new announcement of the 1100/90 large-computer series (see "News & comment," September, for details) deserves attention. Does it shuffle the deck? After all, Sperry claims its largest machine, the 1100/94, offers nearly twice the power of IBM's largest 3081. Critical analysts will quickly judge that high performance is achieved via four-way multiprocessing (a Univac specialty), which IBM, however, intends to implement as well. And the price per million instructions per seconds (MIPS) does not, and perhaps cannot, undercut IBM as it has in the past. So the announcement is obviously terrific for Univac short term, offering attractive upgrade possibilities for its existing customers. But we don't think Univac really expects to win over many diehard users of IBM mainframes.

Who may win over IBM mainframe customers? As a general rule, other mainframers did so during the 1960s, and mini makers did so (by offloading incremental applications) during the 1970s. We believe that the manufacturers of new super-microprocessor-based, fault-tolerant systems, following in the happy footsteps of Tandem Computers Inc., are the group to watch for the rest of this decade. The only other competitors likely to affeet IBM are the plug-compatible mainframe (PCM) manufacturers.

When we discuss fault-tolerant systems, which we do often these days as Tandem's Nonstop systems pile success upon success, we may really be talking about systems that provide very competitive throughput per dollar in transaction processing. Since high levels of system availability and data integrity are often requirements of such systems, the "new wave" manufacturers, such as Computer Consoles (Rochester, NY), Parallel Computer (Englewood Cliffs, NJ), Sequoia and Stratus (both in Natick, MA), and Synapse (Milpitas, CA), have begun attacking the transaction market with novel architectures that assure such reliability, availability, and serviceability.

We have calculated that the current worldwide market for online transaction systems, already approximately $5 billion per year, is growing in excess of 20 percent, perhaps twice as fast as other mainframe applications (including both batch and interactive computing). And the mainframe machines, which were essentially designed when the world was mostly batch, are already on the defensive in this competition. While the reliability of mainframes is improving to acceptable levels for most transaction applications, the newcomers are capturing users' imaginations and gaining momentum.

With regard to the PCM makers, their long-term assault on IBM's large systems may be based on a lower level of compatibility than demonstrated today. Amdahl (and others) may not be able to, or wish to, main-

Market for mainframes

IBM versus the plug-compatible mainframe (PCM) manufacturers and the "bunch"—Burroughs, Control Data, Honeywell, NCR, and Sperry Univac. Dollars are in billions. This table was prepared by Alex. Brown & Sons, Baltimore, based on data supplied by *Business Week*, the Gartner Group, and International Data Corp., Framingham, MA.

	1977	1980	1984
IBM	$ 7.28	$ 9.98	$13.45
PCM makers	.78	3.27	4.12
Bunch	3.14	3.96	4.12
Totals	$11.20	$17.21	$21.69
Percentage of total market			
IBM	65	58	62
PCM makers	7	19	19
Bunch	28	23	19

FOLLOWING THE LEADERS

tain the current high level of compatibility. While many industry watchers have predicted this evolution, it would be a potential blockbuster were it to in fact occur, because the psychological value of true compatibility may be the key to this business. Our present view is that with perhaps longer delays, compatibility as far down as the "principal of operations" level is possible. But even with lower compatibility, Amdahl's total systems capability in the mid-'80s will be much greater than even today. Its systems software plans (which involve inserting a new interactive timesharing system in the systems software foreground) point to possible divergence from IBM standards.

Whatever level of compatibility is achieved, it is becoming clear that the major plug-compatible suppliers will offer full-system alternatives to IBM equipment.

IBM's vulnerability may lie in its own software-development progress, which may not be as rapid as users wish. For example, it looks as though IBM's relational-version database-management system, IMS, may not be integrated with SQL/DS for a while, and IMS may be losing competitiveness against some new IBM spinouts.

These potential software deficiencies could open the door to increased competition from the vendors of PCMs and fault-tolerant systems in the mainframe marketplace during the years ahead. As an exercise, we could assume that without increasing the overall market size, the fault-tolerant systems would have an impact on three other categories of mainframe manufacturers—IBM (a category by itself), the PCM makers, and "the bunch" (the second tier of mainframe manufacturers behind IBM). The table, "Combined market: Mainframes and fault-tolerant systems," shows the possible effect of this competition. □

Combined market:

Mainframes and fault-tolerant systems

When the transaction-oriented or fault-tolerant systems (FTSs) are considered as competitors to mainframes, the effect of the former (assuming the total 1984 market for both is the same) is to cut more deeply into IBM's share of the market in 1984 than into the shares of the PCM makers or the bunch. All dollars are in billions.

	1977	1980	1984
IBM	$ 7.28	$ 9.98	$12.45
PCM makers	.78	3.27	3.87
Bunch	3.14	3.96	3.87
FTS makers	–	0.00	1.50
Totals	$11.20	$17.21	$21.69
Percentage of total market			
IBM	65	58	57
PCM makers	7	19	18
Bunch	28	23	18
FTS makers	–	–	7

Tandem competition grows

Has the arrival of still another well-financed vendor of fault-tolerant systems contributed to the recent sharp drop in the price of shares of Tandem Computers Inc.? The president of Synapse Computer Corp., Mark Leslie, sees the Synapse N+1 system as competing with IBM mainframes as much as with Tandem's Nonstop systems. He claims that the microprocessor-based system can offer the power of an IBM 3081 for transaction processing. Fault tolerance is essential in transaction processing, and Leslie claims that much more is needed. The N+1 system, based on Motorola's 68000 processor, offers ease of expansion and programming. The operating system is written in Pascal, but applications can be written in Cobol as well. A basic system costs $340,000.

Leslie says that there are more than enough transaction-processing applications for Tandem, Synapse, and the growing list of competitors in the fault-tolerant market. His assertions are backed by two market-research houses. Dataquest and Itom International. The former projects a $19.5 billion market by 1985, while the latter sees a $22 billion market in 1986. Synapse is located at 801 Buckeye Court, Milpitas, CA 95035, (408) 946-3191. *Circle 546*

Gideon I. Gartner is founder and president of the Gartner Group Inc., 72 Cummings Point Rd., Stamford, CT 06904, (203) 964-0096. The professional services firm provides continuous tracking and analysis of the information industry to users of electronic information and information-processing equipment.